Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	Docket No. 12-268

COMMENTS OF VERIZON AND VERIZON WIRELESS

Michael E. Glover
Of Counsel

John T. Scott, III
Robert G. Morse
Christopher D. Oatway
1300 I Street, N.W.
Suite 400 West
Washington, DC 20005
(202) 515-2400

Attorneys for Verizon and Verizon Wireless

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SUMMARY

Spectrum is the lifeblood of the wireless industry – an increasingly important sector of the U.S. economy. That industry comprises thousands of tower siting and other infrastructure vendors, equipment and device suppliers, and mobile content and app providers, as well as service providers, which are collectively investing tens of billions of dollars, generating jobs and strengthening the economy. But the growth of the wireless sector depends on a sufficient supply of spectrum. Consumers, businesses, public safety and governments at all levels are increasingly using and benefiting from the rapid technology advances in wireless, such as the construction of new 4G networks that will enable even more services that advance consumer welfare. These benefits depend on the Federal government's ability to deliver substantial amounts of additional spectrum to meet the public's growing needs. That is why the upcoming 600 MHz auction must deliver the maximum amount of spectrum to meet the growing needs of wireless consumers.

The Notice of Proposed Rulemaking makes major progress toward designing an incentive auction that will achieve Congress's Spectrum Act objectives and repurpose spectrum to benefit the American public. A well-designed auction that maximizes participation by broadcasters and wireless service providers alike and ensures that all potential bidders are eligible to participate will benefit the U.S. economy by increasing the amount of spectrum available to meet the growing need for wireless broadband, and will help achieve Congress's revenue goals. To succeed, this first-of-its-kind auction must be as transparent and predictable as possible, given the inherent complexity of conducting an incentive auction. The more certainty the rules provide, the more broadcasters and wireless providers will participate, the more spectrum will be repurposed to meet the needs of consumers and businesses for broadband, and the more Congress's revenue goals will be met. The Commission should promote certainty, and resolve

issues that will inform other aspects of the auction's design, by issuing early decisions regarding key issues including the spectrum clearing target, available reverse auction bids, the bid assignment and repacking methodology, and changes to broadcast technical and other rules.

Verizon's comments address four discrete topics related to the design of the auction and the rules for the new 600 MHz band, and offer recommendations for each. On many issues, Verizon fully supports the Commission's proposals. On some, Verizon suggests alternative approaches that are intended to achieve the most efficient and successful incentive auction and meet Congress's objectives.

1. Adopt a Band Plan that Maximizes the Value of the Spectrum for Wireless Industry Use.

Rules ensuring that the cleared spectrum is technically and economically attractive to the wireless industry are crucial to a successful forward auction that maximizes participation by existing and new service providers. Many of the Commission's proposals, such as locating paired uplink spectrum adjacent to the 700 MHz band, promote that goal. Modifications to the band plan, however, are needed to protect 600 MHz mobile broadband providers from interference from the remaining broadcast television operations, and to ensure that service providers and their vendors can efficiently incorporate the 600 MHz band into wireless devices and networks.

The band plan must have the flexibility to ensure that mobile operators can utilize the auctioned spectrum across the country for efficient deployments, while avoiding interference between wireless operations and broadcast operations. The configuration of spectrum blocks auctioned in any particular geographic market (which may be adjacent to a market where a different amount of spectrum clears) must both optimize the value of the spectrum auctioned in that specific market and account for the interrelatedness among markets. For example, in

geographic markets where less spectrum clears, the band plan must place broadcast operations to mitigate interference between the remaining broadcasters and mobile operations in adjacent markets where more spectrum clears. And the duplex gap (which can accommodate appropriate low-power devices but not broadcast stations) must line up across all geographic markets in order to facilitate the development of a single device filter.

The optimal band plan depends in large part on how much spectrum clears in different geographic markets, but under all scenarios the Commission should focus on repurposing as paired spectrum the spectrum currently allocated for TV Channels 38 through 51. The band plan should maximize the amount of paired spectrum made available for the forward auction by offering equal amounts of uplink and downlink in paired 5x5 MHz blocks, with the paired uplink constituting the upper channels adjacent to the lower 700 MHz band in order to minimize interference problems. Unpaired blocks of spectrum (i.e., supplemental downlink) should be auctioned on a market-by-market basis where more spectrum clears than can be efficiently dedicated to paired blocks, including in blocks below Channel 37. To maximize the attractiveness of the auctioned spectrum (and the success of the auction process), the Commission should auction all mobile spectrum in generic 5 MHz blocks suitable for FDD operations.

Verizon's proposed band plan will effectively accommodate LTE deployment in the 600 MHz band. It also has the advantage of avoiding the costs of relocating incumbent operations out of Channel 37, and efficiently using spectrum by employing Channel 37 as part of the guard band (which, like the duplex gap, can accommodate appropriate low-power uses) between mobile and broadcast operations.

2. Maximize Broadcaster Participation through the Reverse Auction Design.

To repurpose broadcast spectrum successfully, a substantial number of broadcasters need to participate in the reverse auction. Maximizing broadcaster participation will in turn maximize the amount of spectrum cleared, consistent with Congress's objectives. To achieve those goals the auction must be sufficiently predictable and transparent that broadcasters can reasonably analyze the business merits of participating in the auction. The Commission has appropriately reached out to the broadcaster community to explain the potential benefits of participation and solicit broadcasters' input, and those efforts should continue.

The Commission should also promote broadcaster participation by adopting early rules and guidance that will provide more certainty and predictability to broadcasters evaluating whether to participate. Rather than wait until the auction is imminent, the Commission should as soon as possible announce a spectrum clearing target of at least 120 MHz and the repacking procedures it will apply to non-participating broadcast stations. As to the design of the incentive auction, conducting the reverse and forward auctions simultaneously has clear advantages over a sequential auction. The descending clock approach holds promise for encouraging wide broadcaster participation, and the Commission will need to ensure that it can effectively integrate that approach with the other interdependent components of the incentive auction. The Commission should also grant extended confidentiality protection to reverse auction participants' identities and bids.

The Commission should also modify the current broadcast service rules to create incentives for additional broadcaster participation. Specifically, it should provide regulatory relief to participating broadcasters, accommodate relocation to both high-VHF and low-VHF channels, allow relocating stations to accept additional interference or a reduced service area,

and adopt clearing options for Channel 51 stations. The Commission should take this last step as soon as possible to facilitate early relocation of Channel 51 stations, enabling 700 MHz A Block licensees to provide wireless services to customers where they are today blocked due to Channel 51 licensees' protected broadcast contours.

3. Maximize Wireless Provider Participation in the Forward Auction.

The Commission should reject calls for spectrum aggregation limits or other restrictions on bidder participation. In addition to conflicting with Congress's direction in the Spectrum Act not to impose eligibility restrictions, they would undermine robust forward auction bidding, contrary to Congress's objectives. Limits would potentially suppress the value of bids and inefficiently distort the results of the auction by restricting companies that value the spectrum the most from obtaining it to serve their customers. They would also inject additional uncertainty into an auction that is already the most complex the Commission has ever administered.

The Commission should adopt procedures that encourage robust participation by new and existing wireless providers, by making the process as simple as possible and continuously informing bidders what spectrum is available and in what markets. It should thus conduct an ascending clock auction of generic 5 MHz blocks. Because of the clear technical benefits of deploying contiguous spectrum, the Commission should award winning bidders of more than one block in a market licenses for contiguous blocks. The Commission will also maximize the value of and bids for the spectrum in the forward auction by authorizing limited package bidding for groups of generic 600 MHz licenses.

To avoid suppressing demand, distorting bids, and deterring quick and efficient mobile broadband deployment, the Commission should not impose rules that could saddle 600 MHz licenses with regulatory burdens that make them unattractive to wireless operators looking to

expand or initiate service. Nor should it impose closing conditions beyond what the Spectrum Act requires because doing so would only complicate the auction and risk deterring participation and limiting the amount of spectrum cleared.

The Commission also should revise its application of the anti-collusion rule, which has put undue limits on routine business discussions, and imposed significant costs on auction participants. In addition to clarifying that the rule will not apply to communications between reverse and forward auction participants on non-auction matters, the Commission should revise the scope of the rule to eliminate counterproductive restrictions on routine business discussions. An anti-collusion rule of narrower scope would avoid deterring participation in the incentive auction while fully protecting against collusion.

4. Adopt 600 MHz Service Rules That Promote Rapid Deployment of the Spectrum.

The Commission correctly proposes to apply many of its Part 27 service rules for the 700 MHz band to the new 600 MHz band. Applying these proven rules and principles will provide much-needed certainty in an inherently complex auction and promote rapid build-out of 600 MHz spectrum to serve the public.

The Commission should, as the *NPRM* proposes, extend its successful flexible use policy to the 600 MHz band, use Economic Areas (EAs) as the geographic service area for all 600 MHz licenses, and apply the same 700 MHz power limits, out of band emissions limits, interference rules and other technical rules to the 600 MHz band, although a different protective field strength limit is appropriate to protect broadband LTE operations. The Commission should also extend existing rules for partitioning, disaggregation, and leasing to the 600 MHz band; those rules have promoted an active secondary market that puts spectrum in the hands of companies that can best put it to productive use. The Commission should also provide clear pre-auction guidance to

forward auction participants on coordinating 600 MHz band operations on Canada and Mexico border regions so that bidders can valuate that spectrum and plan networks accordingly. Population-based build-out requirements similar to those recently adopted for the new AWS-4 band are also in the public interest because they will promote rapid deployment of advanced wireless services, and the Commission should ensure that broadcasters are timely cleared from the repurposed 600 MHz band to facilitate such deployment. And, to avoid interference problems that would reduce the attractiveness of the spectrum to mobile operators, the Commission should promptly begin clearing wireless microphone and Low Power Auxiliary Services devices and operations from the spectrum to be repurposed.

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The Commission's Notice of Proposed Rulemaking[1] is a groundbreaking step toward achieving Congress's mandate in the Middle Class Tax Relief and Job Creation Act to repurpose substantial amounts of spectrum for mobile broadband services and to speed deployment of additional wireless services to the public.[2] Verizon and Verizon Wireless ("Verizon")[3] thus strongly support the Commission's effort to design an auction that will maximize the amount of repurposed spectrum for inclusion in the new 600 MHz band, because an auction that achieves that objective will also provide substantial benefits to the U.S. economy and to consumer welfare.

INTRODUCTION

As the Commission has correctly found, wireless service providers require additional spectrum to meet their customers' demands. Data prove that customers are increasingly using

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[1] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions,* Notice of Proposed Rulemaking, Docket No. 12-268, 27 FCC Rcd 12357 (2012) ("*NPRM*").

[2] *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, §§ 6402, 6403, 126 Stat. 156 (2012) (the "Spectrum Act").

[3] In addition to Verizon Wireless, the Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc.

wireless for their broadband needs, buying more devices and services that access the Internet, increasing their minutes of use of those devices and services, and downloading more bandwidth-intensive applications for purposes as diverse and important as monitoring health and conserving energy. The Obama Administration's objectives for wireless broadband and the Commission's National Broadband Plan recognize that new licensed spectrum is necessary for service providers to meet these demands, and to preserve the economic growth and innovation that mobile broadband services have engendered.[4] Conversely, the Commission also recognized that "[t]he growth of wireless broadband will be constrained if government does not make spectrum available to enable network expansion and technology upgrades . . . [resulting in] higher prices, poor service quality, an inability for the U.S. to compete internationally, depressed demand and, ultimately, a drag on innovation."[5] To promote and preserve the enormous economic potential of mobile broadband services, the *National Broadband Plan* established a goal of making 300 MHz of spectrum newly available for mobile broadband services by 2015, and 500 MHz by 2020.

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[4] *See* Presidential Memorandum, *Unleashing the Wireless Broadband Revolution*, 75 Fed. Reg. 38387, 38387 (2010) ("America's future competitiveness and global technology leadership depend, in part, upon the availability of additional spectrum. . . . Expanded wireless broadband access will trigger the creation of innovative new businesses, provide cost-effective connections in rural areas, increase productivity, improve public safety, and allow for the development of mobile telemedicine, telework, distance learning, and other new applications that will transform Americans' lives."); *Connecting America: The National Broadband Plan*, at 76-78 (FCC 2010), http://download.broadband.gov/plan/national-broadband-plan.pdf ("*National Broadband Plan*"); *see also* FCC Staff Technical Paper, "Mobile Broadband: The Benefits of Additional Spectrum," at 5, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-302324A1.pdf (Oct. 2010) ("Mobile Broadband Technical Paper") ("[a]s smartphones, laptops, and other devices become increasingly integral to consumers' mobile experiences, mobile data demand is expected to grow between 25 and 50 times current levels within 5 years").

[5] *National Broadband Plan* at 77.

In the nearly two years since the *National Broadband Plan*'s release, consumer demand for mobile broadband services and smartphone devices has continued to surge[6] – to such an extent that Chairman Genachowski warned just last fall that the National Broadband Plan targets of 300 MHz and 500 MHz in five and ten years may be insufficient given data usage trends for LTE devices and the emergence of tablet devices and machine to machine technologies that use substantially more data and spectrum capacity than smartphones.[7] According to public estimates, "the average smartphone will generate 2.6 GB of traffic per month in 2016 [(]a 17-fold increase over the 2011 average of 150 MB per month[]), a]ggregate smartphone traffic in 2016 will be 50 times greater than it is today," and mobile-connected tablets alone "will generate almost as much traffic in 2016 as the entire global mobile network in 2012."[8]

Maximizing the amount of newly licensed mobile broadband spectrum through the incentive auction of broadcast spectrum is an essential component of the Federal government's policy of achieving the economic benefits and the transformative capabilities of wireless

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[6] *See, e.g.,* Cisco, "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011–2016," at 5 (Feb. 14, 2012), http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf ("Cisco 2011-2016 Forecast"); Ericsson Mobility Report: On the Pulse of the Networked Society, at 5-13 (Nov. 2012), http://www.ericsson.com/res/docs/2012/ericsson-mobility-report-november-2012.pdf; Reply Comments of CTIA – The Wireless Association, WT Docket No. 11-186, at 5 (filed Apr. 30, 2012) (reporting that data usage on wireless networks grew 123 percent during 2011 (more than 100 percent for the third year in a row) and now amounts to more than 866 billion megabytes a year, and the number of smartphones on wireless providers' networks increased by 43 percent in 2011 to 111.5 million).

[7] *See* Julius Genachowski, Chairman, Federal Communications Commission, Prepared Remarks, University of Pennsylvania – Wharton, at 6-7 (Oct. 4, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf ("Genachowski Wharton Speech").

[8] *See* Cisco 2011-2016 Forecast at 3.

technologies and services.[9] Put simply, further gains in consumer welfare from the wireless sector depend in part on ensuring that the sector has sufficient spectrum, and the 600 MHz auction is essential to freeing that spectrum for wireless use. Moreover, achieving the Spectrum Act's revenue objectives depends on maximizing the incentives of both wireless providers and broadcasters to enter the auction and to vigorously participate, and on ensuring that all potential bidders are eligible to bid. The *NPRM* correctly recognizes the complexity and interrelatedness of the different components of the incentive auction: wireless providers are more likely to participate if there is certainty about what they are bidding for and there is a sufficient amount of spectrum available, while broadcasters are likely to participate only to the extent they perceive that demand for cleared spectrum will be sufficiently robust to make their participation worthwhile. The incentive auction and rules for the new 600 MHz band must:

- Adopt reverse auction procedures that will maximize broadcaster participation in the reverse auction and maximize the number of channels cleared in a given market, while ensuring that that remaining broadcasters are repacked promptly, efficiently and fairly.
- Maximize wireless provider bidding and participation in the forward auction and get the spectrum in the hands of entities that place the highest value on the spectrum by ensuring all interested entities can freely bid without restrictions.
- Maximize the value of the 600 MHz spectrum and speed its deployment to serve the public post-auction, by adopting a band plan that will put the most spectrum to its best use, as well as flexible use and secondary market rules that enable providers to expand services efficiently while enabling market forces to move the spectrum to where it can best be used and produce the greatest consumer welfare.

The *NPRM* appropriately focuses on these interrelated objectives and Verizon supports many of its proposals for achieving them. Below, Verizon also suggests alternatives for some parts of the incentive auction design that are more likely to promote a successful auction. The

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[9] *See National Broadband Plan* at 88, Recommendation 5.8.5 (positing that an incentive auction could repurpose around 120 MHz of broadcast spectrum for mobile broadband).

Commission should: (1) adopt a band plan for paired 5 MHz uplink and downlink blocks above Channel 37 with additional cleared spectrum designated as supplemental downlink; (2) adopt reverse auction design and repacking procedures and modify current broadcast rules to minimize broadcasters' uncertainty and maximize their participation; (3) adopt forward auction rules that are free of restrictions on license eligibility and maximize wireless providers' participation; and (4) adopt 600 MHz technical and service rules that encourage rapid deployment of more wireless broadband capacity and services. Verizon's comments below detail specific recommendations for Commission actions as to each of these four aspects of its incentive auction program.

DISCUSSION

I. THE COMMISSION SHOULD MODIFY THE PROPOSED 600 MHZ BAND PLAN TO SPEED DEPLOYMENT OF WIRELESS BROADBAND SERVICES AND MINIMIZE INTERFERENCE WITH BROADCASTERS.

Like the 700 MHz band repurposed through the Digital Television (DTV) transition, the 600 MHz band can offer wireless providers additional spectrum to meet the growing demands of the public for mobile services, particularly broadband. Many of the Commission's proposals for the 600 MHz band plan will support deployment of broadband services by 600 MHz licensees and will also facilitate an efficient and successful forward auction. Modifications to the band plan, however, are needed to protect 600 MHz mobile broadband providers and television broadcasters from mutual interference, and to ensure that service providers and vendors can efficiently incorporate the 600 MHz band into wireless devices and networks.

For multiple reasons, the Commission should make clearing DTV broadcast operations from Channels 38 through 51, and reallocating those channels to paired spectrum blocks for mobile uses, its primary goal, with supplemental downlink below Channel 37. The *NPRM*'s proposed band plan – including its proposal to locate mobile paired downlink spectrum below

Channel 37 and to place broadcasters in the duplex gap – would create network engineering and handset design issues that would constrain the deployment of advanced mobile broadband services. This section outlines the path toward an optimal band plan configuration that will enable such deployments and therefore promote robust forward auction bidding.

A. The Band Plan Must Facilitate Efficient Deployment and Device Development.

Like the *NPRM*'s band plan proposal, the right band plan framework must have the flexibility to ensure that mobile operators can utilize the auctioned spectrum across the country for efficient nationwide deployments. That means that the configuration of spectrum blocks auctioned in any particular geographic market (which may be adjacent to a market where a different amount of spectrum clears) must both optimize the value of the spectrum auctioned in that specific market and also account for the interrelatedness among markets. First, the auctioned channels in all markets must be lined up in ways that avoid or minimize co-channel interference between broadcast operations remaining in low-clearing markets and mobile operations in high-clearing markets. Second, coordination across geographic markets is necessary to ensure band plan configurations that facilitate efficient national deployment and device development.

The following key principles should drive the development of the national framework:

- Maximize the attractiveness of the spectrum (and the success of the auction process) by creating and auctioning generic 5 MHz blocks suitable for FDD operations.
- Maximize the amount of paired spectrum auctioned on a nationwide basis while avoiding inefficient spectrum use. If even more spectrum is cleared, designate it as supplemental downlink spectrum which can be auctioned on a market-by-market basis.
- Enable successful device and infrastructure deployment by aligning the duplex gap across all geographic markets and by placing all paired spectrum above Channel 37 – with all paired uplink spectrum adjacent to the 700 MHz Band.

- Coordinate the spectrum auctioned in different markets to minimize potential co-channel cross-market interference problems. For example, to the extent broadcast operations in low-clearing markets will unavoidably compromise mobile spectrum in higher-clearing adjacent markets, the broadcasters should be located so they affect only supplemental downlink as opposed to paired spectrum.

A band plan based on these principles will promote robust participation in the forward auction, maximize revenue, and help ensure that the 600 MHz mobile licenses are put to their highest and best use.

B. The Optimal Band Plan Depends on the Amount of Spectrum that Clears in Different Markets.

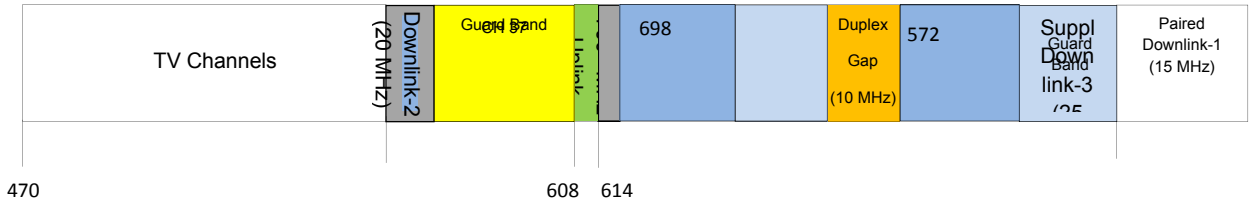
The band plan that will best promote the principles set forth above will depend on the amount of spectrum that clears in various markets across the country. This section first discusses the optimal band plan if substantial amounts of spectrum clear in most or all markets, and then discusses the optimal band plan under a scenario where smaller amounts clear. In each clearing scenario, the optimal band plan discussed here can be adjusted on a market-by-market basis to create a family of plans that can co-exist and that collectively facilitate nationwide deployment and single device development that can work across the family of plans.

1. Maximizing Paired Spectrum Under a High-Clearing Scenario.

Based on currently available information and analyses, under a clearing scenario of 120 MHz, the optimal band plan for promoting the principles set forth in the previous section is:

Figure 1

(120MHz)



This band plan takes full advantage of a high-clearing scenario in order to auction a total of 14 blocks of 5 MHz paired spectrum (for a total of 70 MHz) by creating two sets of paired spectrum in the space above Channel 37. The band plan shown in Figure 1 is optimal for a pass band[10] of this size because a single tunable antenna with two duplexers can cover both pairs of uplink/downlink spectrum. Verizon's current information and analysis indicates that the supported antenna bandwidth (uplink 1 + uplink 2 + duplex gap + downlink 1, or uplink 2 + duplex gap + downlink 1 + downlink 2) needs to be 65 MHz or less or the device antenna size will become impractical (more than 30% larger than 700 MHz device antennas). Practical RF component technology also limits the pass band of the duplexer filters to 25 MHz in order to minimize loss in sensitivity. In addition, any uplink band in Channels 31 to 45 may create harmful uplink harmonics in the mobile device.

While it is theoretically possible to configure a band plan with even more paired spectrum by placing some paired spectrum in Channels 33 through 36, such a structure may not be feasible because of the uplink harmonics and because of form factor limitations. Such a band plan may require an additional antenna or tuner for LTE, and given that 600 MHz antennas are 20-30% larger than 700 MHz antennas, substantial challenges can be expected for device vendors to include up to four 600 MHz antennas in small form factor devices.

The Figure 1 band plan involves certain compromises that are unavoidable if the amount of paired spectrum is to be increased and that are inherent in any band plan featuring more than 50 MHz of paired spectrum. First, although it enables the use of a single antenna (two antennas for 2x2 MIMO), the device needs two duplexers – which would be avoidable with a smaller pass

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[10] *See NPRM* ¶¶ 166-167. A pass band is the range of frequencies that can be covered by a single device filter. *See NPRM* ¶ 140 n.217.

band with 50 MHz or less of paired spectrum that needs only one duplexer. Second, the pass band limitation may compromise the generic nature of certain blocks of auctioned spectrum given that it will be difficult to combine 5x5 licenses from band 1 and band 2 to create larger contiguous blocks of spectrum. Given that a generic block objective can only be fully achieved with 50 MHz (i.e. 25 x 25 MHz paired) or less of paired spectrum due to the filter pass band constraint, it is somewhat compromised to allow for more than 50 MHz of paired spectrum. To make this band plan more generic in terms of ability to generate additional paired blocks, two overlapping duplexers may be used.

The Figure 1 configuration is a base plan that can easily be adjusted and implemented in markets where between 84 MHz and 120 MHz clears: the supplemental downlink below Channel 37 would be reduced (starting with the lower channels) and replaced with broadcast operations. Having a common base plan of paired spectrum above Channel 37 in all markets avoids co-channel interference risk in the paired spectrum. Appropriate geographic buffer zones would need to be implemented to avoid co-channel interference between broadcast operations and mobile services in the supplemental downlink spectrum. These buffer zones may extend into adjacent markets, potentially somewhat compromising the "generic" nature of some of the supplemental downlink in higher-clearing markets.

Where more than 120 MHz is cleared, additional supplemental downlink channels should be assigned below Channel 37, also with appropriate buffer zones to protect from co-channel interference. This approach has the benefit that if more broadcast channels are cleared in the future, it may be possible to add another band of paired spectrum (with the uplink on the lower end of 600 MHz frequency) to effectively create an "upper 600 MHz" above Channel 37 and a "lower 600 MHz" below Channel 37. Verizon's analysis indicates that the uplink band for the

"lower 600 MHz" pair should be located between Channels 26 to 30 to avoid harmful uplink harmonics interference into other bands. However, it should be noted that this third paired band may significantly increase device cost and complexity because few components could be shared across the entire band.

In markets with less than 84 MHz clearing, it is important to align the duplex gaps[11] with the base plan's duplex gap to facilitate the development of a single device that can be used for nationwide deployment. In this case, it may be possible to locate broadcast stations in channels lining up with the uplink or downlink pass bands in Figure 1 – but not in the duplex gap given that broadcasters in the duplex gap can create intermodulation interference issues into device downlink reception. Ideally this configuration should be avoided because it necessitates additional guard bands and buffer zones that may extend into adjacent markets, and because it creates intermodulation interference concerns. In general, the presence of TV broadcast operations in such low-clearing markets could preclude the Commission from auctioning the 600 MHz spectrum in generic blocks because the value of individual blocks would vary depending on the frequency band and geographic proximity of DTV broadcast stations to the 5 MHz blocks in each licensing area. Given the importance of generic blocks to the success of the forward auction,[12] the case-by-case impairments associated with allowing broadcast operations in the duplex gap, uplink pass band, or downlink pass band would create substantial hurdles to conducting a successful forward auction.

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[11] In the configuration of Figure 1, the effective duplex gap for a two-duplexer device is greater than 10 MHz. Further analysis is being undertaken to determine if this gap can be narrowed without undermining performance of future single-duplexer solutions.

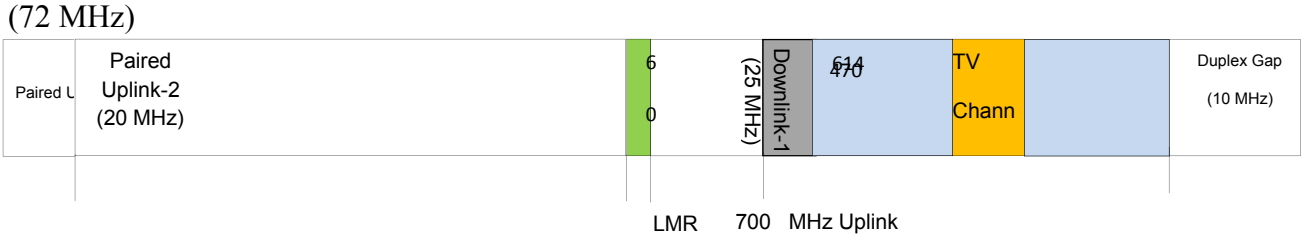
[12] *See infra* Section III.C.

Because of those hurdles and because of the substantial reduction in the amount of paired spectrum that would be auctioned, the Figure 1 band plan would not be optimal if less than 84 MHz clears in a substantial number of markets. While it may be possible to accommodate – as part of a framework that maximizes auctionable paired spectrum across the country – a few outlier markets where less than 84 MHz clears, the Figure 1 band plan should be replaced with a different one under such a lower-clearing scenario.

2. The Optimal Band Plan Under a Lower-Clearing Scenario.

To the extent less than 84 MHz clears in a substantial number of markets, the base band plan must be adjustable to accommodate more TV channels with minimal guard bands. Under this scenario, the following base band plan is optimal:

Figure 2



This configuration is very similar to the alternative band plan discussed in paragraph 178 of the *NPRM*. It maximizes the amount of paired spectrum using a *single* set of paired downlink and uplink blocks and allows up to two broadcast channels above Channel 37 or possibly three broadcast channels above Channel 37 by placing a lower power television station adjacent to the downlink spectrum and reducing the guard band.

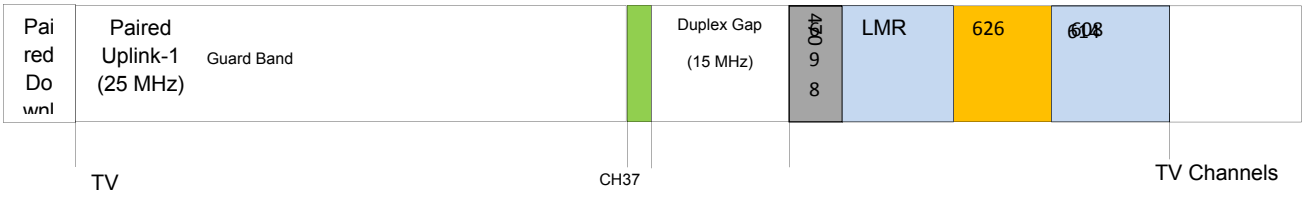
The Figure 2 band plan can be adjusted on a market-by-market basis to accommodate different amounts of spectrum in different geographic markets while retaining the key features needed to facilitate nationwide deployment and to reduce or minimize cross-market co-channel

interference problems. In markets where more than 72 MHz clears, there would be no change in the structure of the paired spectrum or the duplex gap; instead, supplemental downlink blocks would be added to the left of the guard band in those high-clearing markets where extra spectrum is available.[13]

Markets in which only 66 MHz clears can also be configured to include paired spectrum, while successfully co-existing with the Figure 2 configuration, by employing the same structure except that the size of the paired blocks is reduced to 20x20 MHz. Figure 3 below illustrates that configuration:

Figure 3

(66 MHz)



In this 66 MHz configuration, three broadcast channels are located above channel 37. The duplex gap is 15 MHz because device constraints (e.g., the ability to use a single duplexer) require that it line up with the duplex gap in Figure 2. This configuration minimizes co-channel interference problems with markets where more spectrum clears by lining up the broadcast operations in channels 38-40 with either the guard bands or the supplemental downlink in adjacent markets, and not with the paired spectrum.[14]

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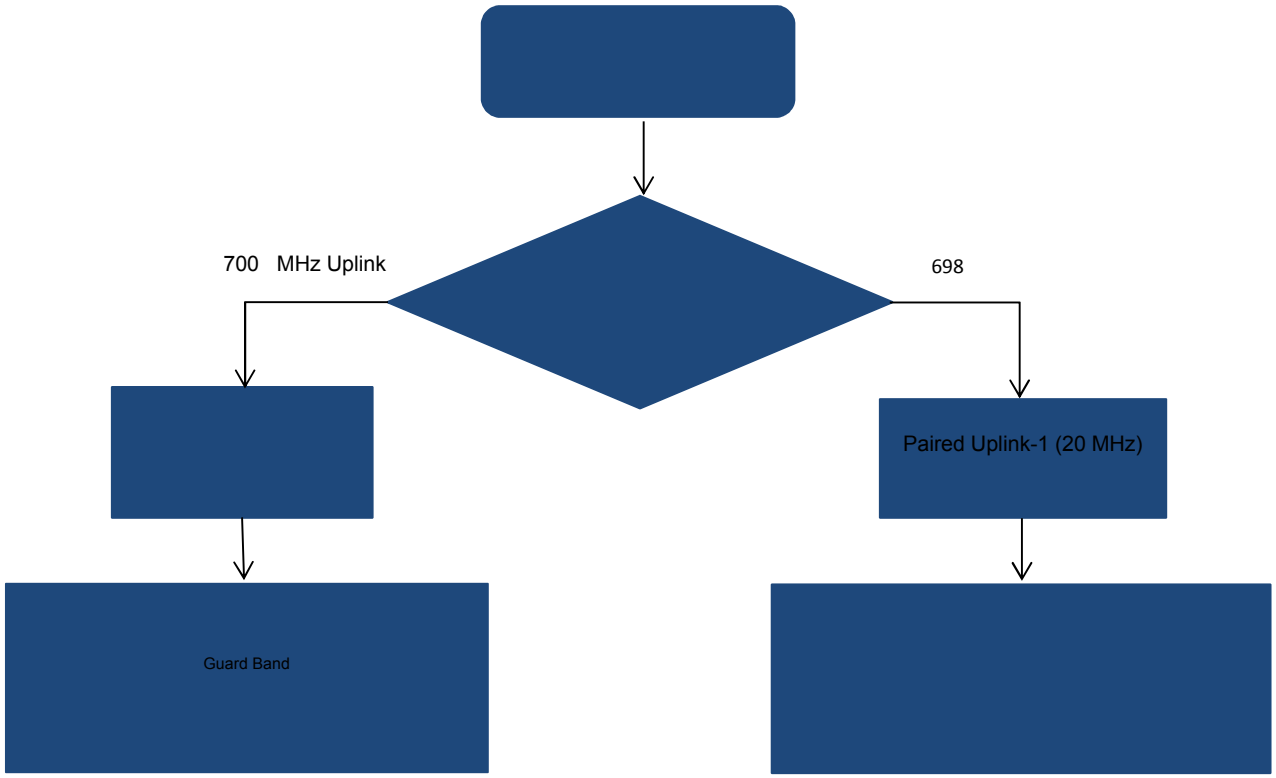
[13] Employing the Figure 1 configuration (for high-clearing markets) is not an option because it cannot co-exist with the Figure 2 configuration. For example, the duplex gaps would not align.

[14] Of course, a buffer zone would be required to the extent this market is adjacent with one where supplemental downlink is located above Channel 37.

The path to determining the optimal band plan is illustrated by the following decision tree:



The viability of a framework that optimizes the amount of generic paired spectrum made available in the forward auction on a nationwide basis is substantially increased if at least 66 MHz clears in all markets. To the extent less spectrum may clear in some markets, strategies would need to be implemented to mitigate the risk that broadcast operations in such low-clearing markets would jeopardize the viability of a national framework that auctions substantial amounts of paired spectrum. For example, in markets where less than 66 MHz clears, it would not be possible to avoid locating broadcast operations in channels that line up with – and therefore potentially create co-channel interference with – mobile operations in adjacent markets where the Figure 2 or Figure 3 band plan is viable. Strategies to facilitate the co-existence of higher-clearing and lower-clearing markets may include configuring band plans in low-clearing markets

so that broadcast stations primarily line up with supplemental downlink (as opposed to paired spectrum) in adjacent high-clearing markets; establishing geographic buffers between markets; and, if it is impossible to avoid compromising some paired spectrum, locating low-power broadcasters in channels that line up with paired spectrum in adjacent markets. The use of such strategies, however, would potentially reduce both the value and the generic-ness of the spectrum to be auctioned in higher-clearing markets.

C. The Commission Should Maximize the Value of the Spectrum Auctioned and Use Spectrum Efficiently.

1. Locate Paired Spectrum Above Channel 37 with Paired Uplink Adjacent to the 700 MHz Band.

The *NPRM* correctly proposes to locate paired uplink spectrum adjacent to the 700 MHz band. That location avoids wasting spectrum because there is no need for a guard band between the Lower 700 MHz band and the 600 MHz band. Moreover, the uplink band should be limited to 35 MHz wide and confined to Channels 46 to 51 to avoid the uplink harmonics problems discussed above.

The band plan, however, should not locate paired downlink spectrum below Channel 37 as the *NPRM* contemplates. The existence of any paired spectrum below Channel 37 would also increase the antenna bandwidth that needs to be supported, thus increasing the size/volume of components due to the low frequencies, creating device feasibility issues. Verizon's band plan proposal avoids those problems by locating paired downlink spectrum in part of the remaining spectrum above Channel 37.

Another advantage of Verizon's band plan is that it, like the NPRM's principal plan, avoids the need to relocate the numerous operations that currently use the spectrum designated as

Channel 37.[15] Under some configurations, Channel 37's placement at the boundary between mobile and broadcast operations would be useful as part of the guard band between mobile and broadcast operations. In other markets, where enough spectrum clears such that mobile broadband can be located below Channel 37, the channels below Channel 37 will be allocated for supplemental downlink. While additional analysis of potential interference issues is needed, under those configurations it would likely be possible to permit existing Channel 37 users to continue to operate on a non-interfering basis.

2. Auction Paired Generic 5 MHz Uplink and Downlink Blocks.

The Commission should use 5 MHz "building blocks" for the 600 MHz band plan, as proposed in the *NPRM*.[16] As the *NPRM* notes, 5 MHz blocks can support a variety of Frequency Division Duplex (FDD) wireless technologies, including LTE, which is the likely technology of choice for 600 MHz broadband licensees.[17]

The Commission should not simply convert the 6 MHz broadcast channels into 6 MHz licenses for 600 MHz mobile services because doing so would strand spectrum.[18] Most 600 MHz licensees using FDD technology will use service channels of 5 MHz or multiples of 5 MHz, consistent with current LTE technology. Therefore, using 6 MHz blocks from the outset would not provide as many license blocks and would leave some portion of the reclaimed broadcast spectrum both unused by the licensed provider and also unavailable for guard bands

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[15] *See NPRM* ¶¶ 179-180.

[16] *NPRM* ¶ 128.

[17] LTE has proven successful because it "provides high spectral efficiency, supports high data rates and implements a flexible access architecture." Magdalena Nohrborg for 3GPP, "LTE Overview," http://www.3gpp.org/lte.

[18] *See NPRM* ¶ 129.

since it would be included in the licensed block. 5 MHz blocks are therefore preferable because they would be far more efficient in maximizing productive use of the repurposed spectrum.

Offering licenses based only on 5 MHz blocks also simplifies the forward auction. With 5 MHz building blocks, the Commission has the opportunity to offer generic licenses for each geographic license area. If bidders want to obtain larger spectrum blocks, they can do so by bidding on multiple generic 5 MHz blocks in the same geographic license area. For this reason, 5 MHz blocks best enable licensees to combine blocks. Mobile broadband providers that want to offer service on a 10x10 MHz or wider service channel can aggregate the 5 MHz building blocks to support such plans. The use of 5 MHz building blocks thus supports the business plans of carriers who want to pursue multiple adjacent blocks in the forward auction or in secondary market transactions after that auction.[19]

Given that generic paired blocks are particularly valuable and important to the auction's success, the Commission should avoid or minimize measures that may affect the substitutability among spectrum blocks. To the extent it is necessary to take measures that might impair some auctionable spectrum in some markets, the Commission should protect paired spectrum from any such impairments. For example, if it proves necessary to create geographic buffer zones or other measures to protect mobile operations in high-clearing markets from co-channel interference from broadcast operations in low-clearing markets, the broadcast channels in low-clearing markets should be lined up with the *supplemental downlink* (not with the paired spectrum) in adjacent higher-clearing markets. By potentially impairing (at most) only supplemental downlink blocks, the Commission would maximize the amount of generic paired spectrum.

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[19] As discussed in Section III.C, the ability to aggregate spectrum during the auction requires a reasonable and transparent procedure for distribution of blocks to winning bidders in the assignment phase.

3. Dedicate Cleared Spectrum as Supplemental Downlink Where It Cannot Be Incorporated Efficiently as Paired Spectrum.

The Commission should license any cleared spectrum that cannot be efficiently licensed in paired spectrum blocks for supplemental downlink.[20] Wireless providers' need for supplemental downlink capacity is growing rapidly because of customers' increasing use of video streaming and other spectrum-intensive uses that place asymmetrical demands on mobile networks. Because supplemental downlink blocks can be used with other spectrum bands (e.g., Cellular, PCS, 700 MHz), they offer more flexibility to industry participants than asymmetrical 600 MHz band licenses.[21] That is why the optimal band plan configurations discussed above feature supplemental downlink in high-clearing markets where the extra cleared spectrum cannot be efficiently licensed as paired blocks. For example, in markets where clearing facilitates mobile broadband operations below Channel 37, the optimal band plan fills that space with supplemental downlink.[22]

The *NPRM* also seeks comment on whether to authorize Time Division Duplex (TDD) operations in the auctioned spectrum.[23] TDD operation on this (and any band) would require guard bands between the bands, reducing the amount of spectrum that could be auctioned to licensees for mobile broadband use. Authorizing TDD would also create substantial technical

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[20] *NPRM* ¶¶ 132-134.

[21] While maximizing paired spectrum is a higher priority than making supplemental downlink available, supplemental downlink spectrum is better than paired spectrum from a device implantation, feasibility, and inter-operability point of view.

[22] Also, as discussed above, the supplemental downlink approach provides the possibility of creating paired bands (in the "lower 600") if additional TV stations below the supplemental downlink are cleared in the future. In order to minimize uplink harmonic interference into other device bands, the uplink block must be located between Channel 26 and 30.

[23] *See NPRM* ¶¶ 183-184.

issues including co-existence of TDD and FDD mobile devices.[24] In addition, as discussed earlier, the generated harmonics from uplink transmissions in a TDD mobile device transmitting on frequencies below Channel 46 would potentially create interference problems within mobile devices.

Moreover, auction bidders will value the reclaimed spectrum the most if employed for FDD use. As the Commission previously explained for 3G technologies, "CDMA2000 and W-CDMA technologies employ a frequency division duplex (FDD) transmission mode that requires a paired-channel architecture and operates in symmetric paired blocks of spectrum. FDD is the most commonly used transmission procedure for PCS, cellular, and other mobile telephony applications and the record indicates it is the technology most likely to be employed in this spectrum."[25] The same is true of the 4G technology LTE. The Commission therefore should not authorize TDD operations in the 600 MHz band.

4. Create at Least a 10 MHz Duplex Gap Free from Broadcast Operations.

A duplex gap between the paired uplink and downlink spectrum blocks spectrum is necessary for FDD operation used for LTE and other technologies.[26] The gap must be at least 10 MHz (and possibly larger, depending on the overall band design). A larger duplex gap results in less insertion loss and also facilitates a larger pass band of 25 MHz or possibly more without impacting sensitivity in the mobile device. Because dedicating sufficient spectrum to the duplex

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[24] Uplink transmissions from one or more TDD-LTE devices can potentially create intermodulation into downlink of one or more nearby FDD-LTE devices due to mixing of FDD uplink transmissions and TDD uplink transmissions.

[25] *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25162, 25179, ¶ 45 (2003).

[26] The "duplex gap" is the amount of frequency separation between the transmit and receive bands. *See NPRM* ¶¶ 166-167.

gap is critical to device design, the Commission should adopt a band plan with at least a 10 MHz duplex gap for the 600 MHz paired spectrum bands.

The Commission proposes to leave broadcast operations in the duplex gap. Verizon does not support that proposal because the duplexer would not be able to provide sufficient attenuation and intermodulation interference would be generated by interactions between 600 MHz uplink transmission and DTV transmissions within the duplex gap. Therefore, leaving broadcast operations in the duplex gap will increase the risk of harmful interference against which current mobile device and base station filter technology cannot protect. In markets with very low clearing, it may be possible to allow TV stations in the uplink or downlink pass bands; however, ideally this should be avoided because it creates additional guard bands and buffer zones that may extend into adjacent markets.

Moreover, the presence of TV broadcast operations within the duplex gap, uplink pass band, or downlink pass band could preclude the Commission from auctioning the 600 MHz spectrum in generic blocks because the value of individual blocks would vary depending on the frequency band and geographic proximity of DTV broadcast stations to the 5 MHz blocks in each licensing area. As discussed above, the case-by-case impairments associated with allowing broadcast operations in the duplex gap, uplink pass band, or downlink pass band would create substantial hurdles to conducting a successful forward auction.

5. Ensure a Sufficient Guard Between Mobile and Broadcast Operations.

Section 6407(b) of the Spectrum Act requires that the guard band size be "no larger than is technically reasonable to prevent harmful interference between licensed services outside the guard bands." Verizon is continuing to analyze the technical issues, but preliminary analysis indicates that the minimal guard band will probably need to be greater than the 6 MHz proposed

in the *NPRM*,[27] at least where mobile operations are adjacent to high-power broadcast operations. Therefore, Verizon's proposed band plan configurations (Figures 1, 2 and 3) assume a minimal guard band of 10 MHz to protect downlink from adjacent high-power broadcast channels.[28] However, it is important to note that in the high-clearing scenario (Figure 1 above), the 6 MHz comprising Channel 37 can be employed as part of the guard band, requiring adding only 4 MHz more to make the minimum 10 MHz total guard band between mobile and broadcast operations on opposite sides of that channel. Appropriate low-power Part-15 type devices could operate in the guard band and the duplexer gap on a non-interfering basis provided they meet certain specifications.

II. THE REVERSE AUCTION AND REPACKING RULES SHOULD MINIMIZE UNCERTAINTY FOR BROADCASTERS AND MAXIMIZE THEIR PARTICIPATION

In order to achieve Congress's objective of promoting wireless broadband deployment by maximizing the amount of spectrum that will be made available for flexible use, the Commission must encourage broad participation by broadcasters. The design of the reverse auction and repacking requirements should be as simple and transparent as possible so that broadcasters know what spectrum rights they will have after the incentive auction and repacking are complete. Those requirements also must work in tandem with the forward auction in a manner that achieves an efficient outcome for all participants and achieves Congress's spectrum repurposing

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[27] *NPRM* ¶ 156.

[28] Under the framework discussed above, in some markets the optimal configuration may involve a guard bands larger than 10 MHz. That is a function of the fact that after clearing broadcast spectrum in blocks of 6 MHz and then dividing the total amount into 5-MHz blocks, in some markets the only reasonable place to locate the remainder spectrum is in the guard band. Tacking on an extra MHz or two to an otherwise-generic block of auctionable spectrum would not make sense. And from a device design point of view, dedicating remainder spectrum to guard band use is technically preferable to increasing the size of the duplex gap.

and revenue requirements. And the Commission must address these matters well in advance of the incentive auction so that the broadcasters for whom the reverse auction may be a viable business option have time to appraise their business models, coordinate with investors, and formulate plans to participate.

A. Early Commission Decisions Should Address Important Reverse Auction Issues to Help Promote Broadcaster Participation.

Chairman Genachowski appropriately has "committed to getting [broadcasters] the information [they] need to make sound business decisions and to help [them] recognize the full value of the opportunity" presented by the reverse auction.[29] The Commission can help achieve this objective by providing broadcasters with an understandable and transparent reverse auction process, and adequate certainty regarding the channel re-assignment method and post-repacking RF interference criteria that will apply to broadcasters remaining after the reverse auction is complete. Verizon discusses specific actions the Commission could take to help ensure a successful reverse auction below.

Verizon encourages the Commission to address and resolve many of these issues now rather than later, through an initial Order or Public Notice that leaves other issues to subsequent decisions. Not only will prompt decisions on some key issues provide broadcasters with more certainty and thus enable them to begin planning for the auction; it could enable the Commission to narrow the scope of the remaining issues, and thus expedite its resolution of those issues before the auction. The Commission should determine, based on the record of the *NPRM* and its

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[29] *See* Julius Genachowski, Chairman, Federal Communications Commission, Prepared Remarks, NAB Show 2012, at 5 (Apr. 16, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-313605A1.pdf.

outreach to broadcasters through the "Learn Everything About Reverse-Auctions Now Program" (LEARN)[30] and other venues, which actions it can take quickly, and complete those actions.

The Commission has discretion to address the issues in this rulemaking in stages.[31] The Spectrum Act does not require otherwise and, indeed, the Commission's implementation of the broadband PCS auctions as well as the 700 MHz auction illustrates its success in addressing issues such as auction processes and service-specific technical and service rules in staged but parallel tracks.[32] The importance of providing certainty for broadcasters, and the threshold nature of many of these issues to the incentive auction design, merits a similar approach here.

The Commission should immediately address the spectrum clearing target.[33] It should promptly announce a spectrum clearing target of at least 120 MHz, an amount consistent with the

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[30] *See* http://www.fcc.gov/learnprogram.

[31] *See ITT World Communications, Inc. v. FCC*, 725 F.2d 732, 754 (D.C. Cir. 1984) (Commission may "resolve some issues and to defer the resolution of other issues when the issues decided were not inextricably related to the issues deferred ….").

[32] The Commission adopted broadband PCS technical/service rules and auction procedures in a series of Orders in different rulemaking dockets. *See Amendment of the Commission's Rules to Establish New Personal Communications Services*, Second Report and Order, 8 FCC Rcd. 7700 (1993), *recon.* Memorandum Opinion and Order, 9 FCC Rcd. 4957 (1994), and Third Memorandum Opinion and Order, 9 FCC Rcd. 6908 (1994) (technical/service rules); *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, Second Report and Order, 9 FCC Rcd. 2348 (1993), Fifth Report and Order, 9 FCC Rcd. 5532 (1994), and Fifth Memorandum Opinion and Order, 10 FCC Rcd. 403 (1994) (auction rules). It did the same for the 700 MHz spectrum. *See Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, et al., Second Report and Order, 22 FCC Rcd 15289 (2007) ("*700 MHz Service Rules Order*") (adopting 700 MHz band plan); Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 8064 (2007) ("*700 MHz First Report and Order*") (adopting 700 MHz band auction and service rules).

[33] *See NPRM* App. C at 9 (describing a "provisional clearing target" for purposes of initiating the reverse auction).

National Broadband Plan and the enormous potential of the incentive auction.[34] By the nature of the two-sided incentive auction, participants' bids and the effectiveness of the Commission's bid assignment and repacking methods will determine the amount ultimately cleared. But a known target can help instruct the Commission's and stakeholders' deliberations about the band plan and, in conjunction with that band plan, provide mobile broadband providers and non-exiting broadcasters an idea of where broadcast and mobile broadband operations could occur in the 600 MHz band post-auction. Moreover, in markets where the repacking formula reveals that Commission can achieve this target entirely through repacking, broadcasters will know that their stations in those markets will not be part of the reverse auction. Broadcasters will also know where repacking alone cannot clear 120 MHz, and this information could be valuable in planning an auction strategy.

Decisions on the bid options that will be available to broadcasters, the bid assignment and repacking methodologies, and live demonstrations of those methodologies for potential bidders well in advance of the auction, are necessary to determine the viability of the various auction designs the Commission has proposed. In addition, the potential impact of repacking on a broadcaster's geographic and population coverage will be relevant to its decision to participate in the auction at all and, if it does, whether it submits an exit bid or chooses another option that enables it to remain on air. Prompt decisions about specific changes to broadcast technical and other rules, and about preserving the confidentiality of broadcasters that decide to participate, will provide more time and certainty for broadcast station owners to assess whether and how to participate in the reverse auction.

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[34] *See* Genachowski Wharton Speech at 5 (stating that the opportunity for "clearing new bands for flexible broadband use" from the incentive auction "is large, particularly given the highly desirable nature of this 600 MHz spectrum for mobile broadband").

Rather than expedite resolution of these and other important issues, however, the *NPRM* proposes to defer doing so. Deferral would push critical issues such as the basic reverse auction design, the sequence of the reverse and forward auction, and the reserve price, to a date *after* other rules are adopted and even closer to the auction.[35] While the Commission (on delegated authority to the Wireless Telecommunications Bureau) typically details the auction-specific procedures for forward auctions in a Public Notice closer to the auction date, the complexities of the incentive auction and novel issues facing potential auction participants compel a different approach here. Moreover, the unique and groundbreaking nature of the incentive auction has statutory implications for how the Commission proceeds with these important issues. The Commission must ensure that broadcasters and other interested parties have adequate time to evaluate new rules and plan their businesses accordingly.[36] Most broadcasters have never before participated in a spectrum auction, so the usual timing of auction-related notices is not sufficient. The Commission and the relevant Bureau(s) should instead work to resolve as many issues as possible sooner rather than later, and should announce all auction procedures well in advance of the auction.

B. The Commission Should Conduct the Reverse and Forward Auctions Simultaneously.

The Commission seeks comment on how best to integrate the reverse and forward auctions and, in particular, whether the auctions should be run simultaneously or sequentially.[37]

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[35] *See NPRM* ¶ 273; *id.* at App. A, proposed rules §§ 1.22002(b), 1.22003(b)-(c).

[36] *See* 47 U.S.C. § 309(j)(3)(E) (Commission must ensure "an adequate period is allowed— … after issuance of bidding rules, to ensure that interested parties have a sufficient time to develop business plans, assess market conditions, and evaluate the availability of equipment for the relevant services ….").

[37] *NPRM* ¶¶ 66-68.

A simultaneous auction would better serve all participants' common interests in limiting the duration of the auction process and encouraging broadcaster participation, ultimately clearing more spectrum.

Under a "sequential" approach, the Commission presumably would first conduct the reverse auction for a range of target channels, thus determining the clearing prices for each target and generating a form of supply curve of incrementally lower amounts of spectrum that would be available at each subsequent round of the forward auction. The Commission then would conduct the forward auction, and the entire auction would "close" when the Commission determines the maximum number of channels that can be cleared based on the submitted bids, ensuring that the revenues from the forward auction are sufficient to meet whatever closing conditions are adopted.

Under a "simultaneous" approach – which also can be described as a "staged" or "interleaved" approach – both the reverse and forward auctions would proceed in stages:[38]

- *Reverse Auction.* The initial stage starts with a target of broadcast spectrum to clear, and a reverse auction is conducted to determine what prices stations would accept to exit (or channel share), move to VHF, or for other bids as the Commission might allow, in order to meet the target. The prices from the winning bids are used to calculate the total cost.

- *Forward Auction.* The Commission next (or concurrently) conducts a forward auction to determine the bidders that would receive licenses created via the repurposed spectrum, using the band plan associated with this clearing target. The auction then reveals the total amount those forward auction bidders are willing to pay.

- *Closing Conditions Met? End.* If, at the end of this stage, the forward auction winning bids cover the closing conditions, then the incentive auction ends.

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[38] *See NPRM* App. C at 9, 14-15; Broadcaster LEARN Program Workshop, *Overview of the Incentive Auction NPRM*, Oct. 26, 2012, at 17-22, http://wireless.fcc.gov/learn/LEARN-Deck-12-5-12.pdf.

- *Closing Conditions Not Met? Continue.* If forward auction revenues do not meet the closing conditions, the initial spectrum clearing target is reduced, the band plan is modified, and the process continues via a second stage of reverse and forward auctions is conducted for remaining bidders (i.e. broadcasters that have not exited the reverse auction and forward bidders that retain eligibility to bid). Closing conditions are reassessed, with reductions in the clearing target based on the outcomes in the previous stage(s). The supply of spectrum is thus reduced, resulting in lower total payments to existing broadcasters and higher bids for the remaining, now scarcer spectrum. This process continues until the closing conditions are met.

The simultaneous approach offers important advantages over the sequential approach, provided that the Commission's auction processes can handle the complexities and quickly assess the optimal bid assignment, repacking, total revenue objectives and band plan changes between or during stages. First, it can result in lower participation costs for reverse and forward auction bidders. The value a broadcaster derives for remaining on air may depend in part on the number of channels cleared (and thus the potential competition for advertising revenues) in its broadcast area. A staged process requires broadcasters to determine this value only incrementally, and not for scenarios that never arise because the auction will already have closed. Similarly, bidders in each stage of the forward auction will know the nationwide band plan applicable during that stage and can more easily determine their willingness to pay for licenses. A sequential approach, in contrast, requires that broadcasters make the necessary valuations for many hypothetical band plan scenarios and thus places an unnecessary burden on potential incentive auction participants. Broadcasters also must reveal more sensitive information under a sequential approach, including the offer price for their channel(s) under those multiple hypothetical band plan scenarios. A broadcaster's concern that such information might be used against its interests could dampen its interest in participating in the auction.

Timing also is an important factor weighing in favor of a simultaneous approach. As noted above, under a sequential approach, participating broadcasters would have to commit to a variety of bids for multiple band plan and post-repacking scenarios. They then would be left

waiting until the operation of the forward auction closes the entire process. Broadcasters may be reluctant to participate in the reverse auction if they are to remain bound to their contingent offers for the duration of the incentive auction. In contrast, a simultaneous approach enables a broadcaster to exit the auction at various incremental stages, thereby limiting the duration of the auction for that broadcaster. Thus, the consequences of bidding behavior would be resolved more quickly, which could also reduce the uncertainty of the reverse auction and make it more attractive for broadcasters.

For these reasons, a simultaneous auction is the best approach, but resolving other components of the Commission's incentive auction regime will be critical to a successful simultaneous auction. Specifically, the Commission must be able to run its bid assignment and repacking algorithms at multiple points throughout the auction stages so that participants will have insight into the available spectrum supply during the bidding stage. Bidders will require confidence that the repacking mechanism can be run quickly and that the results of the algorithm are reliable and repeatable. A dependable repacking mechanism also can provide auction participants with certainty that their bids accurately reflect the applicable band plan for each stage.[39] And the Commission will need to decide how it intends to apply the closing conditions in the context of simultaneous reverse and forward auctions, and which closing conditions to apply.[40]

C. A Descending Clock Reverse Auction Will Encourage Broadcaster Participation.

Because widespread broadcaster participation will be necessary for the Commission to clear the maximum amount of spectrum, the reverse auction mechanism must encourage, not

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[39] *See infra* Section II.G.

[40] *See NPRM* ¶ 69.

deter, broadcaster participation. The Commission can achieve this by ensuring that reverse auction bidders have strong incentives to offer bids that reflect their actual opportunity costs. The *NPRM* describes two general auction designs: a single round sealed bid auction; and a multiple round descending clock auction, described in more detail in the Auctionomics paper.[41] Each option has advantages and disadvantages. A descending clock auction simplifies broadcasters' bidding strategies into a sequence of "In" or "Out" decisions, potentially encouraging bidder participation. Yet, a sealed bid approach is simpler for the Commission to administer, and is less dependent on the speed of the repacking and bid assignment mechanisms.[42]

On balance, a descending clock approach likely has the most potential for encouraging broadcaster participation in the reverse auction. The Commission needs to couple this approach with important auction design components to ensure that the Commission achieves the dual objectives of promoting broadcaster participation and achieving an efficient outcome. The initial reverse auction reserve price for each of the exit, channel sharing and VHF relocation options must be high enough to ensure that broadcasters will have incentive to participate in the first instance.[43] In addition, the Commission's repacking and bid assignment mechanisms will need to run accurately in real time to avoid disrupting and delaying the auction for reverse and forward bidders alike. Thus, the Commission will need to effectively integrate the descending clock approach with the other interdependent components of the incentive auction.

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[41] *NPRM* ¶¶ 38-40, App. C.

[42] *See NPRM* ¶ 40.

[43] *See NPRM* ¶ 53.

D. The Commission Should Not Disclose Reverse Auction Bidder Identities.

Verizon agrees that the Commission should incorporate into its auction rules the Spectrum Act's requirement to "take all reasonable steps necessary to protect" a licensee's identity and data in its competitive bidding rules.[44] The Spectrum Act establishes the *minimum* period during which the Commission must protect such information (through the reassignment and reallocation process)[45] and does not preclude the Commission from continuing to protect such information from public disclosure after the auction concludes pursuant to Exemption 4 of the Freedom of Information Act.[46] Such longer protection may be a prerequisite for certain broadcasters to participate in the auction, as the mere fact that a company is participating in the reverse auction, not to mention information such as bid selection and bid valuation, is highly competitively sensitive, particularly (but not exclusively) for participants whose bids are not accepted. The Commission therefore should order that the identity of reverse auction bidders, any of the bids they submit, and data that would enable the public to determine a bidder's identity will be exempt from public disclosure both during and after the incentive auction.

E. Both Algorithms for Selecting Winning Bids Have Merit But the Commission Should Announce Its Choice Well In Advance of the Auction

The Commission seeks comment on two principal reverse auction bid assignment procedures – the "integer programming" and "sequential algorithm."[47] The Commission's choices present clear trade-offs. An integer method for choosing the winning bids is, in design at least, probably more effective at finding the winning bids that will maximize the amount of

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[44] *See NPRM* ¶ 257, 259.

[45] *See* Spectrum Act § 6403(a)(3).

[46] *See* 5 U.S.C. § 552(b)(4); *NPRM* ¶ 261.

[47] *See NPRM* ¶¶ 45-46.

spectrum reallocated for flexible use because it could determine more expeditiously which of the various bids and feasible repacking solutions would minimize the amount of the total bids while clearing the maximum amount of spectrum. On the other hand, the sequential algorithm would be easier for the Commission to implement and probably would more effectively ensure that the reverse auction proceeds smoothly and concludes quickly – benefits that will be important for broadcasters as well as forward auction participants.

If an integer programming method could operate as quickly as the sequential algorithm method, it would be preferable because it would clear the maximum amount of spectrum most efficiently. The Commission may find, however, that given the complexities and variables involved with integer programming, its software may not be able to find an optimum solution within a reasonable amount of time. Timeliness is particularly critical for the proposed descending clock auction because the algorithm must be run and the band plan regenerated throughout the auction on a nearly real time basis.

If the Commission is unable to resolve these complexities and variables, then on balance the more transparent sequential algorithm would appear to provide more certainty to broadcasters and thus have greater potential to encourage their participation in the reverse auction – which is also critical to maximizing the spectrum reallocated for flexible use. Developing the software program that can reach a good result quickly should be less of a burden for the Commission and can have countervailing benefits – namely encouraging broadcaster participation – that can help offset the loss of an optimal outcome, particularly if the difference between the two options can be minimized. Alternatively, if the Commission is able to develop a reliable integer method that reaches an optimal result quickly, it could run both methods in parallel during the auction, and use the sequential algorithm in those cases when the integer program does not generate the result

quickly enough, or limit use the integer method to the later auction rounds when the final allocations and assignments are in sight, while using the sequential method to help expedite the auction during the earlier stages.

Whichever method the Commission plans to use, it should disclose its selected method(s) as soon as possible. This process should include publication of a full description, with the relevant source code and a test case that could be used to verify the operation of the software, and should include the location/power database and the interference model used. This will allow broadcasters to verify that the constraints used in the repacking algorithm properly reflect the Commission's RF interference rules and enable forward auction participants to evaluate the effectiveness of the software in helping derive the band plan.

F. The Commission Should Provide Relief from Existing Broadcast Service and Ownership Rules to Promote Broadcaster Participation.

The Commission seeks comment on additional measures to encourage broadcaster participation in the reverse auction. Several of these measures could enhance broadcasters' interest in the auction, thus improving the likelihood of a successful auction.

1. Relief from Media Ownership and Other Rules.

The Commission should, as it proposes, "grandfather any station combinations that would no longer comply with [its] multiple ownership rules as a result of the" incentive auction, to avoid discouraging reverse auction participation.[48] In creating a one-time market-based mechanism for broadcast licensees to exit the market entirely through the reverse auction, Congress necessarily understood that there would be fewer broadcasters in many markets, which could place the remaining stations in violation of ownership rules. In addition, to the extent that

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[48] *NPRM* ¶ 356.

the results of the auction may have longer term implications for the Commission's multiple ownership and other ownership rules and policies, the Commission can consider further changes to the ownership rules in its quadrennial regulatory reviews under Section 202 of the Telecommunications Act,[49] and should not restrict reverse auction participants' bid opportunities on that basis.[50]

2. Accommodating VHF Relocation.

Many broadcast stations may be willing to accept compensation to relocate to the upper *or* lower VHF bands, particularly smaller or middle-sized stations for which must carry rights may be more valuable than retaining all of their existing POPs or coverage area through the repacking process. The 30 MHz of spectrum in the lower VHF band (Channels 2-6) is largely unutilized, and high VHF spectrum has far fewer stations than UHF, including in areas where UHF is highly utilized and where demand for flexible use spectrum will be most acute. Moreover, while the noise floor in the VHF band is problematic for broadcast operations (particularly at lower VHF), the incentive auction presents an opportunity to promote more efficient use of that spectrum by encouraging voluntary relocation to the upper *and* lower VHF band.

The Commission should consider allowing broadcasters the opportunity to submit a variety of VHF relocation bids in the reverse auction. It could also take steps to accommodate existing and future VHF operations after repacking in both the upper and lower VHF bands. These options could include allowing a broadcaster in the UHF spectrum to limit its relocation

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[49] *See* Telecommunications Act of 1996, Pub.L. No. 104-104, § 202(h), 110 Stat. 92 (1996).

[50] *See NPRM* ¶ 48 (seeking comment on whether to "consider in the repacking and assignment procedures whether a given broadcaster going off the air would create areas without any commercial or noncommercial broadcast television service.").

bid to the high VHF channels where the noise floor problems are less acute, accommodating broadcasters' reasonable requests for waiver of the height and power limits to improve VHF coverage, ensuring that must carry rights are preserved, and allowing (and encouraging) broadcasters in the high VHF or UHF band to relocate to the lower VHF band in exchange for a winning bid in the reverse auction.[51] These actions could achieve more efficient use of the lower VHF band, particularly if coupled with a renewed Commission effort, begun in its 2010 Notice of Proposed Rulemaking, to take additional measures to improve the viability of lower VHF through modified power limits and improving indoor and outdoor rooftop antenna performance.[52] In addition, some stations may be able to utilize low power repeaters on a secondary basis, or even distributed transmitter systems on a primary basis, to provide enhanced coverage to the outer portions of their new service areas in the upper or lower VHF bands to overcome noise floor issues.

3. Additional Interference.

Verizon supports allowing broadcasters to accept additional interference or a reduced service area as a method of encouraging additional broadcaster participation in the reverse auction.[53] This option could appeal to broadcasters that view a percentage loss in over-the-air covered POPs as a calculable percentage loss in their business, and even to larger stations that do not rely on their must carry rights for cable TV carriage and view their over the air viewers separately. Allowing broadcasters to submit an alternative bid based on coverage would likely add a degree of complexity to the Commission's administration of the auction, including the bid

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[51] *See NPRM* ¶¶ 85-86.

[52] *See Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements to VHF*, Notice of Proposed Rulemaking, 25 FCC Rcd 16498, ¶¶ 42-57 (2010).

[53] *See NPRM* ¶¶ 87-88.

assignment and repacking methodology. But given the potential benefits, including the possibility that such a bid to accept additional interference (thus reducing a station's covered POPs while maintaining must carry rights) could free up more spectrum at a possibly lower price than an exit bid, the Commission should consider the feasibility of this approach.

For example, allowing a broadcaster to offer two bids – one to exit the spectrum, and the other to accept interference to, say, ten percent of its covered population – could create more flexibility in the repacking process and lower the cost of clearing significant spectrum amounts. In this scenario, where a broadcaster obtains approximately ninety percent or more of its viewing through carriage on cable or satellite systems, a ten percent loss of over-the-air covered POPs may translate to a one percent loss of viewership. Indeed, the impact may be even less because viewers on the fringes of coverage (where the relevant co-channel or adjacent channel interference would occur) may be more likely to watch the programming via cable or satellite to begin with. In addition, as noted above, broadcast stations may be able to regain some covered POPs via low power repeaters or distributed transmitter systems to enhance coverage to these portions of their service areas and mitigate interference from other stations.

The Commission should thus consider the feasibility of allowing broadcasters to accept up to ten percent interference to their covered POPs at a given price. Ten percent was the highest range of acceptable interference permitted during the DTV transition, so this calculation should be feasible for broadcasters.[54] One potential method for implementing this approach would be to provide reverse auction bidders with a sliding scale option for which the final payment would depend on the percentage of POPs interfered with that the broadcaster would

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[54] *See Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service*, Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order, 13 FCC Rcd 7418, ¶¶ 78-87 (1998).

accept. Thus, for example, a broadcaster that bids $2 million per percentage lost up to ten percent but, after repacking, loses only five percent of covered POPs, would receive no more than $10 million for its winning reverse auction bid. In rural markets, where there are more available channels and fewer stations, there may be no need to invoke this option under the bid assignment and repacking algorithms (and OET Bulletin 69), but in urban areas (and markets adjacent to urban areas), where potential interference issues associated with repacking will likely be more of a problem, this option could encourage more stations to participate.

4. Pending Renewal/Enforcement Actions and Transactions.

The Commission correctly proposes that the pendency of a license renewal application or enforcement action against a broadcaster should not render it ineligible to participate in the reverse auction.[55] There could be particular benefit in providing broadcasters in pending enforcement proceedings with the option of a standard settlement amount in order to provide them with additional certainty for bid valuation purposes.[56] The Commission might also provide broadcasters with additional regulatory certainty by facilitating the processing of transfer of control or assignment applications that may be necessary for a particular station to participate in the reverse auction. For example, the Commission could issue a Public Notice advising interested parties that want transfer of control or assignment applications granted before the reverse auction to file them by a given date sufficiently in advance of the reverse auction.[57]

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[55] *See NPRM* ¶¶ 81-83.

[56] *See id.* ¶ 83.

[57] *Cf. Wireless Telecommunications Bureau, Public Safety and Homeland Security Bureau, and Office of Engineering and Technology Provide Reminder of January 1, 2013 Deadline for Transition to Narrowband Operations in the 150-174 MHz and 421-512 MHz Bands and Guidance for Submission of Requests for Waiver and Other Matters*, Public Notice, DA 11-1189, 26 FCC Rcd. 9647 (2011) (urging parties to file waiver requests before the end of 2011); *Commercial Mobile Radio Service Year-End Transfer and Assignment Applications*, Public

G. The Commission Should Disclose the Repacking Methodology Well In Advance of the Reverse Auction and Ensure that it Maximizes the Spectrum Cleared for Mobile Broadband Use.

The repacking formula and methodology is important for reasons beyond preserving broadcasters' post-auction Spectrum Act rights. The repacking methodology the Commission uses will be closely tied to its bid assignment processes, so it is critical that the Commission be able to "run" the repacking formula quickly and predictably to ensure that the reverse *and* forward auctions run smoothly and that broadcasters have certainty. The Commission also should conduct simulations well in advance of the auction. Moreover, the Commission should test the methodology in advance of the reverse auction in those markets where repacking alone is sufficient to meet the clearing target. These actions would demonstrate to forward auction participants that the band plan on which they will bid during an auction round accurately reflects the spectrum that would be available.

The Spectrum Act also requires that the Commission take "reasonable efforts" to preserve the broadcasters' coverage areas and population served. Although individual channel assignments are subject to the parameters of OET Bulletin 69, the Commission should apply its repacking methodology in a manner that maximizes the Commission's flexibility so as to maximize the amount of spectrum reallocated for flexible use. For example, population served should be based on *total* over-the-air population, not "the same specific viewers."[58] Otherwise, the Commission would be locked into preserving existing geographic markets irrespective of the different RF environment in which the repacked station would operate. For that reason as well, changes in coverage area contemplated within OET Bulletin 69 clearly should be considered the

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Notice, 12 FCC Rcd. 15228 (1997) (recommending that CMRS transfer and assignment applicants seeking year-end approval file their applications by particular dates).

[58] *See NPRM* ¶¶ 105-06.

minimum that is "reasonable" under the Spectrum Act. Finally, the Commission should apply the Bulletin in a manner that preserves a broadcaster's Designated Market Area (DMA)-based community of license in a manner that enables broadcasters to retain carriage rights to help ensure the viability of VHF relocation and channel sharing bids.[59]

H. The Commission Should Act Now to Promote Clearing of Channel 51.

Existing broadcast operations at Channel 51 already pose deployment challenges for mobile broadband providers in the adjacent Lower 700 MHz A Block. Many A Block licensees cannot provide coverage throughout their licensed service areas due to significant adjacent-channel interference challenges. Under the Commission's rules, A Block licensees may not deploy service in exclusion zones designed to protect DTV receivers, and must accept harmful interference into their mobile broadband networks.

The Commission already sought comment on how to address those issues in a separate proceeding and has a full record on which it can act.[60] Rules addressing repacking, reverse auction eligibility and reimbursement eligibility should enable and encourage Channel 51 licensees to cease or relocate their operations in the near term. The Commission's rules should, for example: allow Channel 51 broadcasters to channel share with other broadcasters, without losing either their ability to participate independently in the incentive auction or their must-carry rights; adopt expedited procedures under which Channel 51 broadcasters may relocate to other

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[59] *See* 47 U.S.C. § 534(h).

[60] *See Promoting Interoperability in the 700 MHz Commercial Spectrum, Interoperability of Mobile User Equipment Across Paired Commercial Spectrum Blocks in the 700 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 12-69, 27 FCC Rcd 3521, ¶ 44 (2012); AT&T Comments in WT Docket No. 12-69 at 45-46; CTIA Comments in WT Docket No. 12-69 at 3-6; Blooston Rural Carriers Comments in WT Docket No. 12-69 at 5; Rural Telecommunications Group Comments in WT Docket No. 12-69 at 13-14, National Telecommunications Cooperative Association (NTCA) Comments in WT Docket No. 12-69 at 8-9; MetroPCS Comments in WT Docket No. 12-69 at 12.

available channels,[61] and determine whether it is feasible to ensure that Channel 51 licensees that voluntarily relocate to below Channel 31 (i.e. beyond a 120 MHz clearing target) are not relocated a second time as a result of the repacking algorithm; permit the sale of Channel 51 licenses to entities (including wireless providers) that will not operate on the spectrum pending the upcoming incentive auctions, thus allowing the broadcaster to "auction" its license now and the purchaser of that license to participate in a future incentive auction; allow Channel 51 broadcasters to maintain non-operational licenses beyond one year if necessary,[62] or waive the minimum operating requirements for Channel 51 broadcasters and any other rules that may prohibit a licensee from ceasing operations[63] – either of which would allow Channel 51 broadcasters to cease operations without losing their licenses and thus their ability to participate in a future incentive auction.[64] The Commission should act on these proposals now through a separate Order, which will provide certainty to existing Channel 51 broadcasters that the incentive auction will remain a viable option for them.

III. THE COMMISSION SHOULD DESIGN THE FORWARD AUCTION TO PROMOTE MAXIMUM PARTICIPATION BY WIRELESS PROVIDERS.

A. The Forward Auction and 600 MHz Service Rules Should Impose No Eligibility or Spectrum Aggregation Restrictions.

Section 6404 of the Spectrum Act provides that the Commission cannot "prevent a person from participating in a system of competitive bidding" if that person complies with the

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[61] *See* CTIA Comments in WT Docket No. 12-69 at 6.

[62] *See* 47 U.S.C. § 312(g) ("If a broadcasting station fails to transmit broadcast signals for any consecutive 12-month period, then the station license granted for the operation of that broadcast station expires at the end of that period . . . except that the Commission may extend or reinstate such station license . . . to promote equity and fairness.").

[63] *See, e.g.*, 47 C.F.R. § 73.1740(a)(2) (requiring TV stations to operate no less than 2 hours each day and no less than 28 hours each week during their first 36 months of operation).

[64] *See* AT&T Comments in WT Docket No. 12-69 at 47-48.

Commission's auction rules and meets the technical, financial, character and citizenship qualifications.[65] That requirement is consistent with the Commission's repeated finding that open eligibility for wireless spectrum allocations serves the public interest and is clearly the most efficient means for licensing spectrum by auction.[66] Allowing all interested parties to participate fully in the forward auction without limits on that participation is not only statutorily mandated, but it will ensure that the 600 MHz spectrum is put to its highest and best use, as required by Section 309(j).[67]

The Commission states that it intends to apply the statutorily-required open eligibility standard for this incentive auction,[68] but it also requests comment on whether to adopt a rule of "general applicability" to promote the goals of 47 U.S.C. § 309(j)(3)(B).[69] Those goals are to promote "economic opportunity and competition" and to ensure that "new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants…."[70] Given the highly competitive nature of the wireless industry and the robust bidding to be expected in the forward auction, any rule that restricts bidding is likely to *undercut* – rather than promote – those goals, because it would suppress demand and fail to ensure that spectrum is put to its best and most productive use. These risks posed by eligibility limits are particularly acute given

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[65] Spectrum Act § 6404, *codified at* 47 U.S.C. § 309(j)(17)(A).

[66] *See, e.g.*, *700 MHz Service Rules Order*, 22 FCC Rcd at 15383-84, ¶ 256.

[67] *See 700 MHz Service Rules Order*, 22 FCC Rcd at 15385, ¶ 259 (*citing Implementation of Section 309(j) of the Communications Act – Competitive Bidding,* Second Report and Order, 9 FCC Rcd 2348, 2349-50, ¶¶ 3-7 (1994) ("*Competitive Bidding Second R&O"*)).

[68] *NPRM* ¶ 381.

[69] *Id.* ¶¶ 383-84.

[70] 47 U.S.C. § 309(j)(3)(B).

Congress's authorization of only one incentive auction of the broadcast spectrum in the 600 MHz band.[71]

First, any restriction could not be justified. The Commission has recognized that restrictions on spectrum ownership could only be appropriate if there is a finding of a "significant likelihood of substantial competitive harm in a specific market."[72] Given the strong and increasing competition in the market for mobile broadband, there is no indication that competitive harm would develop for services provided using 600 MHz spectrum. According to the Commission's Fifteenth Wireless Competition Report, 97 percent of the U.S. population already lives in census tracts with access to three or more different operators offering mobile telephone service.[73] The vast majority of these operators also offer some form of data service. Indeed, most wireless providers are in the process of deploying 4G networks that will offer wireless consumers broadband services at speeds faster than DSL. Over 80 percent of the U.S. population lives in census tracts with access to three or more mobile broadband providers, and over 90 percent lives in census tracts with access to two or more mobile broadband providers.[74]

The Commission recently confirmed the expansion of the mobile broadband market, noting that the "[b]est available estimates of mobile broadband coverage by 3G or better technologies (including CDMA EV-DO, EV-DO Rev. A, WCDMA/HSPA, HSPA+, mobile WiMAX, and LTE) indicate growth from 98.1% of the U.S. population in November 2009 to 99.4% in January 2012. . . . In addition, the percentage of the population covered by at least four

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[71] *See* Spectrum Act § 6403(e).

[72] *700 MHz Service Rules Order*, 22 FCC Rcd at 15383, ¶ 256.

[73] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Fifteenth Report, 26 FCC Rcd 9664, 9669 (2011) ("*Fifteenth CMRS Report*").

[74] *Id.* at 9670.

mobile broadband providers increased from 58 percent to 79 percent during that period."[75] In this competitive market, any interested mobile provider should have the option of fully participating in the bidding for all 600 MHz spectrum available in the forward auction.

Second, restricting bidders from acquiring the spectrum they need to serve their customers would harm competition and consumers because at least some portion of the available spectrum would likely go to providers other than those that value it most and are most likely to deploy it productively. Restricting auction participation would "risk reducing the likelihood that the party valuing the license the most will win the license and put it to use for the benefit of the public."[76] Instead, it could result in the spectrum being held by an entity that is not capable of utilizing it and deploying service in the most efficient manner. As the Commission has noted, it is preferable for "the marketplace forces operating through the auction process, rather than regulatory fiat, [to] determine which of the multitude of service proposals will actually be implemented."[77] Thus, any rule restricting open bidding would likely *undercut* the Commission's statutory mandate to facilitate "the development and rapid deployment of new technologies, products, and services" and to promote "economic opportunity and competition."[78]

Third, rules restricting bidding would artificially suppress demand for the 600 MHz spectrum and risk not meeting the closing conditions and Congress's other fiscal goals for the

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[75] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act,* Ninth Broadband Progress Notice of Inquiry, 27 FCC Rcd 10523, 10525, n.12 (2012).

[76] *700 MHz Services Rules Order,* 22 FCC Rcd at 15385, ¶ 259.

[77] *Service Rules for the 746-764 and 776-798 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, First Report and Order, 15 FCC Rcd 476, 489, ¶ 31 (2000) ("*Upper700 MHz Service Rules Order"*).

[78] 47 U.S.C. § 309(j)(3)(A), (B).

auction. By "reducing the likelihood that the party valuing the license the most will win," [79] the robustness of overall bidding is reduced – and with it the prospect that substantial competition among bidders will drive bid amounts. Empirical evidence from past auctions supports the conclusion that "the effects of limiting particularly strong bidders from participating are detrimental to auction revenues."[80] Indeed, losses to the U.S. Treasury "could amount to billions of dollars."[81]

Fourth, restrictions such as a per-service area cap would reduce revenues by suppressing demand. Indeed, it could facilitate arbitrage by bidders taking advantage of below market prices at auction and then reselling the licenses on the secondary market to entities that value the spectrum more highly. Such an outcome would have the perverse effect of funneling dollars that should go to the U.S. Treasury into the hands of private parties.[82] It would also inject uncertainty into the forward auction and undermine vigorous bidding. [83] Because it is not possible for a bidder to know whether a particular bid will win and potentially place it over a cap, imposing a cap could cause bidders to forego bidding for certain licenses to avoid the possibility that the total amount of spectrum won might exceed the cap. Forward auction bidders will not know how much spectrum will ultimately clear, so they will not know ahead of time the amount spectrum on which they can bid in a market without violating the cap. And the problem is further complicated insofar as different amounts of spectrum may be available in different

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[79] *700 MHz Service Rules Order*, 22 FCC Rcd at 15385, ¶ 259.

[80] *See, e.g.*, Michael L. Katz, "An Economic Analysis of Auction Set Asides" at 9, ¶ 14 (May 2012), *available at* www.gcbpp.org/files/Academic_Papers/AP_Katz_AuctionSet.pdf.

[81] *Id.* at 10, ¶ 15. Dr. Katz's analysis specifically refers to set-aside rules, but the same economic principles apply to other types of bidding restrictions.

[82] *See* Comments of Verizon Wireless, WT Dkt. No. 12-269, at 33-34 (filed Nov. 28, 2012).

[83] *See NPRM* ¶ 384.

geographic markets and at different stages throughout the auction, making it potentially impossible for a bidder to coordinate bids across multiple markets while complying with the cap everywhere. For example, if only a small amount of spectrum clears in Market A but a large amount of spectrum clears in Market B, a bidder whose business plan involves obtaining the same quantity of spectrum in both markets may forego bidding for at least some of the spectrum in Market B because of the cap imposed in Market A that restricts the bidder to an extremely small amount of spectrum there. Given the substantial uncertainty already inherent in the forward auction, injecting such an additional complication would distort the bidding process and depress participation and revenues.

Accordingly, to the extent the Commission chooses to modify its existing spectrum screen policy, it should avoid imposing constraints on auction participants' ability to participate fully in this or any other specific auction.[84] Section 6404's express prohibition on preventing any person from participating in the auction underscores that conclusion. Under the statute, any rule could affect, at most, a company's overall spectrum holdings after the auction and not its bidding during the auction. If divestitures are required as a result of spectrum acquired in the auction, the only appropriate mechanism would be for affected companies to bring themselves into compliance with any generally applicable rule on a post-auction basis. Relying on post-auction procedures would comply with Section 6404 and avoid artificially distorting or suppressing participation in the important 600 MHz auction.

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[84] The Commission notes that it has an open rulemaking proceeding on whether it should modify its existing spectrum screen and/or adopt any limits on mobile spectrum holdings. *See NPRM* ¶ 384 (citing *Policies Regarding Mobile Spectrum Holdings,* Notice of Proposed Rulemaking, 27 FCC Rcd 11710 (2012)). That proceeding is the appropriate forum to consider any generally-applicable policies governing spectrum holdings, and/or what might constitute an "excessive concentration of licenses."

B. The Commission Should Adopt an Ascending Clock Format Using Generic 5 MHz Blocks

Verizon supports an ascending clock auction using generic 5 MHz blocks.[85] With generic licenses, wireless providers can bid on licenses at a given price during the appropriate stage of the bidding process, without the need to account for disparities in service area and band placement. As a result, the forward auction – and, thus, the overall incentive auction – can proceed and conclude much more quickly. Given that multiple stages of the forward auction would be necessary as part of a simultaneous forward and reverse auction approach, expediting the incentive auction process in this manner can provide some assurance to reverse and forward auction participants alike that the overall auction process will not drag on interminably. This added certainty can help encourage broadcasters to participate that otherwise may be wary about the impact of reverse auction participation on their business plans.

For a generic bidding approach to succeed, however, the Commission must design the auction and the 600 MHz band plan service rules in a manner that ensures that licenses are sufficiently similar. Uniform block sizes and service areas – Economic Areas ("EAs"), as the Commission has proposed – are particularly important in this regard.[86] Designating various block sizes and service areas for the 600 MHz spectrum, as the Commission has done for broadband PCS, AWS and 700 MHz, would preclude the use of generic blocks in the forward auction – which, in turn, would extend the duration of the auction to the detriment of all participants and make the incentive auction irreparably complicated for bidders and the

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[85] *See NPRM* ¶¶ 57-61.

[86] *See infra* Section IV.C (discussing merits of EAs as the applicable service area for 600 MHz licenses).

Commission alike.[87] In addition, service rules that result in bidder- or license-specific burdens, such as an open access obligation imposed on a particular license or performance requirements that are not imposed on all licenses, would preclude an effective generic bid approach. Auctioning such dissimilar spectrum blocks as "generic" would lead to bidder uncertainty, depressed bid amounts and inefficient allocations. Moreover, the Commission's experience in the 700 MHz auction illustrates that imposing disparate service rules and license conditions would limit the substitutability of the licenses and thus the efficiency of the auction, and also would require participants to develop complicated bidding strategies that result in an inefficient bid prices and assignment of licenses.

C. The License Assignment Stage Should Facilitate Contiguous Spectrum Blocks Within and Across Economic Areas.

An effective final assignment phase, in which specific licenses are assigned to specific winning bidders, also will be important for the auction of generic blocks. Even when licenses are intrinsically similar, auction outcomes across different geographic areas may result in winning bidders having different preferences among potential license assignments. In this regard, contiguous blocks within an EA are essential for winning bidders in the forward auction to ensure that they are able to economically deploy networks and provide a viable broadband service in the 600 MHz band. Secondarily – but still very important – the Commission correctly notes that wireless service providers with spectrum blocks across multiple EAs prefer harmonized blocks that encompass the same frequencies.[88]

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[87] *See NPRM* ¶ 147 (noting that smaller CMA license areas "may raise implementation risks for the auction designs" and "complicate potential bidders' efforts to plan for, and participate in, the auction for such licenses").

[88] *See NPRM* ¶ 64.

The successful implementation of generic bidding thus will be highly dependent on the effective operation of a final assignment phase that distributes specific blocks within the generic group to the winning bidders.[89] The outcome of this phase must be transparent, predictable, and reflect bidder preferences to the extent possible. While Verizon is not categorically opposed to competitive bidding for this purpose,[90] for generic licenses this assignment phase (at least with respect to contiguous blocks within an EA) should instead be accomplished through rules and policies that enable the Commission to coordinate assignments among the winning bidders in a sensible manner. The Commission should then rely on the secondary market to sort out discrepancies between EAs, rather than on competitive bidding via a Commission auction.

The Commission's auction rules should thus provide that winners of more than one 5 MHz generic block within an EA will always be assigned contiguous spectrum within that EA, and that winners of multiple and "solo" blocks will be assigned to particular portions of the 600 MHz band (e.g. placing winners of contiguous blocks in the lower part of the applicable bands and solo blocks in the higher part, or vice-versa). This approach will help ensure that the value created by contiguous spectrum blocks as reflected in network and handset design efficiencies will be reflected in the bids for the generic licenses in the preceding auction rounds, thus capturing the potential benefits of using competitive bidding in the assignment round.

The licensing of consistent spectrum blocks *across* broad geographic areas also has value for network and handset design purposes. The Commission should address this issue principally through requirements other than the assignment process by designating license service areas no smaller than EAs and permitting package bidding as described below. In the license assignment

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[89] *See NPRM* ¶ 64.

[90] *See id.* (positing that "[t]here could also be an additional auction phase to assign specific frequencies for generic licenses, which could be based on accepting additional bids.").

process, the Commission nevertheless could, as an administrative matter and to the extent possible, provide winning bidders with the option of consistent frequency assignments across EAs, up to a single REAG. Providing winning bidders with contiguous blocks within an EA would make this task easier for the Commission, as would a policy of presumptively placing winners of multiple versus solo 5 MHz blocks in certain parts of the licensed 600 MHz band.

This process cannot be perfect, however, and beyond an initial "rough cut" the Commission should not seek to resolve inconsistent frequency assignments across EAs through competitive bidding. Wireless service providers have considerable experience in working together to exchange spectrum blocks to optimize their respective spectrum holdings, according to their network configurations and customer needs. Thus, to the extent that individual bidders determine that particular spectrum blocks within the licensed bands are preferable to the blocks the Commission assigned to them, they should have freedom to work with other winning bidders in the secondary market to achieve a mutually beneficial outcome. The Commission should apply flexible assignment application rules and policies to such transactions, including a policy of treating the exchange(s) of 600 MHz blocks among winning bidders within an EA as tantamount to a *pro forma* transaction and presumptively in the public interest.

D. Short Form Applications Will Reveal Where Mutual Exclusivity Could Occur Within EAs.

The Commission "seek[s] comment on how to apply the requirement of mutual exclusivity in the context of the broadcast television spectrum forward auction," particularly in regard to "generic (non-frequency-specific) blocks" and specifically "whether applications to participate in the reverse and forward auctions are 'mutually exclusive applications' for 'initial license[s]' since the reverse and forward auction applicants will submit bids relating to mutually exclusive spectrum usage rights (*i.e.,* the spectrum currently used by broadcast television

licensees)."[91] Section 309(j)'s competitive bidding requirement applies when "mutually exclusive applications are accepted for any initial license."[92] The question of whether applications for licenses are "mutually exclusive" under Section 309 of the Act is generally left to the Commission's service-specific rules, which vary from service to service.[93] The Commission generally has determined whether mutual exclusivity in an auction exists based on the short form application process and can apply that approach here as well.[94]

The Commission's assessment of mutual exclusivity also must account for the unique context of an incentive auction and not undermine Congress's Spectrum Act objectives. Unlike a traditional spectrum auction, the range of specific licenses for which a forward auction participant can submit bids in the incentive auction is unknown at the outset and will change throughout the course of the forward auction up to the assignment round. (This will be the case regardless of whether generic bids are used.) In addition, Congress expressly authorized the Commission to conduct the reverse and forward auctions contemporaneously.[95] Given this statutory context, the Commission could, for example, require that short form applications designate the EA(s) for which the bidder seeks eligibility to participate and find mutual

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[91] *See NPRM* ¶ 292.

[92] 47 U.S.C. § 309(j)(1).

[93] *See, e.g.*, 47 C.F.R. § 22.131 (defining mutual exclusivity in general for Public Mobile Services); *id.* §§ 22.949(a)(2) and (b)(2) (for cellular applications); *id.* § 24.431(a) (for narrowband PCS); and *id.* § 24.831 (for broadband PCS licenses).

[94] *See Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended; Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz*, Notice of Proposed Rulemaking, 14 FCC Rcd. 5206, 5243, ¶ 73 (1999) ("The Commission has found the short-form application process used in conjunction with our auctions to be the most efficient means of determining if mutual exclusivity exists.").

[95] *See* Spectrum Act § 6403(f)(1).

exclusivity if there is more than one short form applicant for a service area containing generic blocks.

E. The Forward Auction Should Permit Limited Package Bidding for Generic 600 MHz Licenses.

In addition to creating a band plan that includes generic 5 MHz paired or unpaired spectrum licenses, the Commission should allow a limited form of package bidding in the forward auction. For example, the Commission could allow bidders to submit package bids for a generic 600 MHz license (specified as a bid on either all paired or all unpaired frequencies if both are available) across each EA within a single REAG. In the assignment stage, such a winning package bid would be assigned a 600 MHz license on the same frequency band in each EA in the REAG. The Commission could also make available a nationwide package bid for a generic license (again, either paired or unpaired, as available) in each of the 176 EAs. Again, in the assignment round, the winning bidder would be assigned the same frequency band license in each EA on a nationwide basis.

Providers may offer mobile broadband services on a nationwide or regional basis. Accordingly, some operators will participate in the 600 MHz forward auction either to complement or expand existing spectrum holdings, or to develop new mobile broadband services that will compete with existing regional or nationwide services. A risk of failing to acquire all licenses in a business plan (the "exposure problem") may inhibit participation in the auction because, for some bidders, the potential for acquisition of all desired licenses is needed to support the amount of a bid for multiple licenses.[96]

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[96] *700 MHz Service Rules Order*, 22 FCC Rcd at 15395-96, ¶ 287.

Allowing forward auction participants the opportunity more readily to acquire regional or nationwide spectrum licenses will benefit their broadband deployment plans. And by allowing the winning bidders to take advantage of the economies of scale in larger licensed areas, package bidding will facilitate more rapid build-out of licensed 600 MHz services, which in turn will benefit consumers. The Commission recognized these public interest benefits for package bidding in Auction 73:

> Minimizing the exposure problem with package bidding should facilitate the entry of applicants whose business plans require the economies of scale that only can be obtained with nationwide operation. We anticipate that package bidding can be implemented so as to shield such bidders from a potential significant exposure problem. Importantly, we also anticipate that it can be implemented without imposing disadvantages on parties that wish to bid on individual licenses comprising the nationwide footprint.[97]

Package bidding also offers an opportunity to increase participation in the forward auction such that the incentive auction would more efficiently meet the closing conditions and other Spectrum Act objectives. Package bidding allows auction participants to bid not just on the value of the individual EA licenses, but also on the value of obtaining all EAs in a REAG over a consistent set of frequencies.[98] Thus, forward auction participants can commit more of their resources toward acquiring licenses in the auction, rather than trying to meet their goals in the subsequent secondary market. If the Commission does not allow package bidding, then at minimum it should accept bids on every license in the auction until bidding has stopped on all

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[97] *Id.* at 15397, ¶ 290.

[98] In past auctions, winning bids on larger licenses have raised more per MHz/POP than have bids on smaller licenses. In Auction 66 for AWS spectrum licenses, the REAG licenses sold for an average of $0.705 per MHz/POP, while CMA licenses sold for $0.417 per MHz/POP. The EA licenses for Block B sold at $0.451 and for Block C at $0.548. Jeremy Bulow, et al., "Winning Play in Spectrum Auctions," NBER Working Paper Series, No. 14765 at 25 (Mar. 2009).

licenses. The Commission has previously noted that "[t]his approach . . . allows bidders to take advantage of synergies that exist among licenses and is administratively efficient."[99]

F. The Commission Should Narrow the Scope of the Anti-Collusion Rule.

The goals the Commission identified when it adopted the auction anti-collusion rule in 1994 remain sound today – to prevent parties from "agreeing in advance to bidding strategies that divide the market according to their strategic interests and disadvantage other bidders," to "strengthen confidence" in the bidding process, and to "help ensure that the government receives a fair market price for the use of the spectrum."[100] But since then, the Commission has extended its restrictions to routine business discussions,[101] causing uncertainty as to whether discussions not related to bids or bidding strategies or post-auction market structure could violate the rule. The Commission has acknowledged that this approach goes well beyond the nation's antitrust laws, but there is no evidence that it enhances "the competitiveness of the auction process and of the post-auction market structure."[102] Companies are now forced to weigh the significant costs of putting unrelated, conventional business negotiations on hold for months at a time against the potential advantages of auction participation. Some firms have likely foregone participation in

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[99] *Auction of Advanced Wireless Service Licenses Scheduled for June 29, 2006*, Public Notice, 21 FCC Rcd 4562, ¶ 138 (2006) ("*AWS Auction Procedures PN*").

[100] *Competitive Bidding Second R&O*, 9 FCC Rcd at 2386 ¶ 221.

[101] *Wireless Telecommunications Bureau Provides Guidance on the Anti-Collusion Rule for D, E, and F Block Bidders*, Public Notice, DA 96-1460, 11 FCC Rcd. 10134 at 10135 (WTB 1996) (instructing potential auction participants that the anti-collusion rule "may affect the way in which they conduct their routine business during the auction" and that "management, resale, roaming, interconnection, partitioning and disaggregation agreement negotiations may all raise impermissible subject matter for discussion by applicants").

[102] *Competitive Bidding Second R&O*, 9 FCC Rcd at 2387, ¶ 225 (1994). *See also* Public Notice, *Auction of 700 MHz Band Licenses Scheduled for January 24, 2008; Notice and Filing Requirements, Minimum Opening Bids, Reserve Prices, Upfront Payments, and Other Procedures for Auctions 73 and 76*, DA 07-4171, 22 FCC Rcd 18141, 18153 (Auctions Div., 2007) ("*700 MHz Auction Procedures PN*").

auctions because the substantial burdens on routine business outweigh the potential benefits of auction participation. These uncertainties place undue limits on routine business discussions, impose significant costs, and the Commission should take this opportunity to narrow the scope of the rule to ensure that it does not deter auction participation.

First, the anti-collusion rule should apply only to discussions that directly convey information regarding bids or bidding strategies or directly relate to post-auction market structure, but not to other unrelated routine business discussions – an approach consistent with the Commission's enforcement actions today.[103] Business negotiations that do not directly involve any such communications or agreements do not violate the rule, so the Commission should clarify that business discussions including those regarding management, resale, roaming, interconnection, and partitioning and disaggregation agreements are not prohibited, unless the participants expressly convey information regarding their bids or bidding strategy or post-auction market structure. The Commission should also confirm that discussions regarding generic technical handset and network issues, such as discussions in industry standards-setting bodies and discussions with manufacturers regarding specifications for network equipment or handsets, are not prohibited. At a minimum, the Commission should allow applicants to segregate their representatives negotiating such arrangements from those company employees involved in, and knowledgeable about, the company's auction and bidding strategy. To the extent that such

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[103] *See, e.g., Northeast Communications of Wisconsin, Inc*., Forfeiture Order, 19 FCC Rcd 18635 (EB 2004); *Star Wireless, LLC*, Forfeiture Order, 19 FCC Rcd 18626 (EB 2004); *Star Wireless, LLC and Northeast Communications of Wisconsin, Inc*., Order on Review, 22 FCC Rcd 8943 (2007), *rev. denied*, *Star Wireless, LLC v. FCC*, 522 F.3d 469 (D. C. Cir. 2008)); Mercury PCS II, LLC, *Notice of Apparent Liability for Forfeiture*, 12 FCC Rcd 17970 (1997), *aff'd Memorandum Opinion and Order*, 13 FCC Rcd 23755 (1998), *aff'd High Plains Wireless, L.P. v. FCC*, 276 F.3d 599 (D.C. Cir. 2002)); *Cascade Access, L.L.C*., Notice of Apparent Liability for Forfeiture, 24 FCC Rcd 1350 (EB 2009), *aff'd* Forfeiture Order, DA 13-32 (EB rel. Jan. 11, 2013).

separation is established and there is no prohibited communication to or from individuals outside of the applicants' auction teams, there is no risk of harm to the auction. Second, the Commission should narrow the definition of "applicants" for purposes of the rule to include the filing entity and its controlling equity interest holders, but otherwise exclude persons/entities holding a ten percent or greater interest in the filing entity.[104] A commercial agreement between a holder of a non-controlling interest in a filer and another auction applicant does not bind the filer or otherwise influence its behavior in the auction in a way that would disadvantage other bidders. Further, a minority non-controlling interest holder is highly unlikely to have knowledge regarding the filer's bids or bidding strategy at auction. Yet application of the rule in this instance could bar non-controlling entities from a variety of commercial transactions that otherwise would advance the economy and benefit consumers. In any event, the Commission's policies barring prohibited communications via a third party conduit would apply to non-applicants.[105]

Third, the Commission should shorten the period during which the rule is in effect to the period between the short-form application deadline prior to the auction and when the bidding closes, rather than extend it to the date when long-form applications are due, as in the past. (For example, in Auction 73 the anti-collusion rule was in effect for four months, from December 3, 2007 to April 3, 2008.) Once the bidding closes, communications between auction applications

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[104] *See* 47 C.F.R. § 1.2105(c)(7)(i).

[105] *See Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures*, Seventh Report and Order, 16 FCC Rcd 17546, 17550 (2001) (cautioning applicants "against indirectly communicating their bids or bidding strategies to each other through third-party discussions or disclosures to other auction applicants"); *AWS Auction Procedures PN,* 21 FCC Rcd, ¶ 17 (cautioning against "dealings with other parties, such as members of the press, financial analysts, or others who might become a conduit for the communication of prohibited bidding information.").

cannot, by definition, affect participants' bids or bidding strategies, and cannot disadvantage other bidders. To the extent such communications could result in winning bidders defaulting on their final payments, the Commission can assess an appropriate default penalty.[106] Given the complexities of the incentive auction, moreover, extending the period during which the rule is in effect until the long-form application deadline could result in an extensive, unnecessarily long period under the anti-collusion rule.

Finally, the Commission should not prohibit or restrict communications between reverse auction applicants and forward auction applicants. There is no basis in the *NPRM* or otherwise to conclude that such communications or agreements could disadvantage other bidders in either the reverse or forward auction.[107] In the reverse auction, broadcasters will engage directly with the Commission as to bidding options and bid amounts, and will not entertain offers from individual applicants in the forward auction. There is thus no reason why discussions between reverse and forward auction applicants could make either auction less competitive – particularly as forward auction applicants will likely bid on generic blocks of spectrum rather than broadcasters' current licensed frequencies.

In no event should the Commission prohibit business discussions between broadcaster and mobile broadband providers unrelated to an auction applicant's bids or bidding strategies, or the post-auction market structure. The *NPRM* recognizes that discussions between a broadcast affiliate and a network programming supplier "on issues unrelated to the reverse auction" would not fall within the rule's communications prohibition,[108] and this type of guidance should

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[106] *See* 47 C.F.R. § 1.2104(g)(1); *700 MHz Auction Procedures PN*, 22 FCC Rcd at 18211 ¶¶ 267-68.

[107] *See NPRM* ¶ 269.

[108] *See NPRM* ¶ 264 n.405.

similarly apply to discussions between a broadcast licensee and a wireless provider regarding content deals and other types of arrangements "unrelated to the reverse auction" such as distribution of the broadcaster's programming over the carrier's network, or discussions of broadcaster/wireless collocation at tower sites, or wireless service resale arrangements.

G. The Commission Should Not Impose Closing Conditions Beyond What the Spectrum Act Requires.

The Commission seeks comment on how best to implement the three statutory "closing conditions" (payment of reverse auction winning bids, the Commission's administrative costs, and repacking reimbursements)[109] and "whether there are additional statutory, policy or other considerations that should be addressed in establishing the closing conditions."[110] The Commission can most effectively achieve Congress's multiple Spectrum Act objectives – freeing up substantial amounts of new spectrum for mobile broadband services while providing additional revenues for other programs, such as the nationwide public safety broadband network – through a well-designed incentive auction that does not restrict bidder participation and a band plan and service rules with wide appeal to mobile service providers. Such measures will help ensure that spectrum is licensed to those entities that value it most and, thus, will incidentally result in substantial revenue to the Treasury.

Importantly, such an approach is most consistent with Section 309(j) of the Communications Act and the Spectrum Act itself, which prohibit the Commission from adopting a competitive bidding methodology based "solely or predominantly on the expectation of Federal revenues" and do *not* require incentive closing conditions other than those enumerated at Section

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[109] *See* Spectrum Act § 6403(c)(2).

[110] *NPRM* ¶ 69.

6403(c)(2).[111] Congress could have modified Section 309(j)(7) and made revenues for the nationwide public safety broadband network and other programs a condition of closing, but it chose not to do so. Finally, should the forward auction fail to meet any additional conditions, the Commission risks a *complete* failure of the incentive auction – which would be a far worse outcome for the nationwide public safety broadband network than an auction that raises some but not all the $7 billion statutory maximum. For these reasons as well, he Commission should not impose additional closing conditions beyond those the Spectrum Act requires.

IV. THE RULES FOR 600 MHZ WIRELESS OPERATIONS SHOULD PROMOTE RAPID USE OF THE SPECTRUM TO SERVE CUSTOMERS.

A. The 700 MHz Band Technical Rules Mostly Provide the Right Model for 600 MHz Licensees.

Verizon supports the Commission's proposals to apply the 700 MHz out-of-band emissions limits, power limits, and antenna height restrictions at Part 27 to 600 MHz band licenses, but recommends a modified field strength limit. Verizon thus generally agrees with the Commission's assessment that the similarity between the 700 MHz and 600 MHz bands supports adoption of the same or similar rules, with one notable exception.

Out-of-Band Emissions. The out-of-band emissions limit and the measurement procedure set forth in Section 27.53(g) of the Commission's Rules will provide adequate protection from harmful interference within the 600 MHz band.[112] Applying this rule also will ensure adequate protection for 700 MHz uplinks at the boundary between the proposed 600 MHz uplink and

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[111] *See* 47 U.S.C. § 309(j)(7)(B); Spectrum Act § 6403(c)(2).

[112] *NPRM* ¶ 188. 47 C.F.R. § 27.53(g) provides in principal part: "[T]he power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater."

Lower 700 MHz uplink bands.[113] Verizon agrees that the proposed out-of-band emissions limit for 600 MHz will protect any Channel 37 services that require protection from flexible use operations.[114] As was discussed above regarding the band plan, any remaining DTV channels should be separated by at least 10 MHz from mobile services, and thus no additional protection to or from adjacent DTV channels is needed for 600 MHz flexible use licenses.

Power Limits. The Commission's power limit proposals in the *NPRM* are appropriate for 600 MHz licenses. For downlink operations, fixed and base station power limits in non-rural areas would be 1000 watts per MHz ERP for emission bandwidths greater than 1 MHz and 2000 watts ERP in rural areas.[115] While the 700 MHz power limits generally make sense in this context, Verizon agrees that the Commission should not apply here the power flux density requirements adopted for 700 MHz because those requirements protect base station receivers from other high powered base stations, a consideration not presented here because high powered base stations are not allowed in the 600 MHz band.[116] For uplink operations, the Commission should adopt a power limit of 3 watts ERP for both portables and mobiles,[117] and apply the same prohibition on fixed and base station operations in the uplink bands that applies to the 700 MHz band. There should be no provision for high power control stations for public safety operations in the 600 MHz uplink band.

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[113] *NPRM* ¶ 189.

[114] *NPRM* ¶ 191.

[115] *NPRM* ¶ 193; *see* 47 C.F.R. §§ 27.50(c)(3), (4).

[116] *NPRM* ¶ 193.

[117] *See* 47 C.F.R. § 27.50(c)(10).

Antenna Height Restrictions. Verizon supports application of the 700 MHz band flexible antenna height rules to the 600 MHz band.[118]

Co-Channel Interference Among 600 MHz Systems. Unlike the field strength limit of 40 dBμV/m that the Commission adopted for 700 MHz licensees, the Commission should adopt a 50 dBμV/m per MHz field strength limit for 600 MHz licensees. This limit is more appropriate for broadband LTE technologies and will better ensure that 600 MHz licensees do not cause interference to co-channel systems operating in adjacent geographic areas.[119] Accordingly, the Commission should apply a different limit to 600 MHz licenses.

B. Flexible Use Is the Best Model for 600 MHz Broadband Licenses.

Verizon supports the Commission's proposal "to provide 600 MHz licensees with the flexibility to provide any service that is consistent with the allocations that are adopted for this spectrum."[120] To fully implement this policy and to lay the groundwork for longer-term flexible use of this spectrum, the Commission also should add a fixed and mobile designation to the UHF and VHF bands in the Part 2 Table of Allocations, as proposed in the *NPRM*.[121] The Commission's flexible use policy, as adopted also for 700 MHz,[122] benefits the public interest: "As a matter of practice, licensees continually devise and update the types of advanced devices they deploy, and improve the management of the dynamic spectrum use between and among

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[118] *NPRM* ¶ 195; *see* 47 C.F.R. § 27.50(c) (Tables 1-4).

[119] *See* 47 C.F.R. § 27.55(a)(2).

[120] *NPRM* ¶ 374.

[121] *See NPRM* ¶ 121.

[122] *700 MHz Service Rules Order,* 22 FCC Rcd at 15378-79 ¶ 242 (goal of adopting flexible use policy for 700 MHz spectrum is "to remove regulatory impediments in order to enable more efficient use of licensed spectrum"); *see Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59),* 17 FCC Rcd 1022, 1023 ¶ 1, 1051-52 ¶¶ 70-71 (2002) (adopting flexible use policy for 700 MHz spectrum).

their subscribers, consistent with the applicable service rules and their respective business models."[123] Allowing licensees to decide how best to meet consumer demand by offering one or more different services is one of the bedrock principles that has fostered a competitive, innovative wireless industry.[124] The Commission's flexible use policy has allowed the wireless industry to flourish and respond in a variety of ways to consumer demand, and should apply to 600 MHz licensees as well.

In this regard, the Commission should not interfere with licensees' ability to choose which bands to include in wireless devices. As discussed above, if a significant amount of spectrum clears, the auction may result in assignment to wireless licensees of more spectrum than one mobile device or base station duplexer can cover.[125] It is possible to build a device that supports multiple filters or duplexers, but each additional duplexer imposes additional cost and complexity that must be weighed against other factors, such as the bands that must be included in the device to operate on the provider's existing networks.[126] In making decisions on wireless device design, wireless providers and vendors must take into account a number of considerations because of current limitations on how many and what type of duplexers can be included in the same device, as well as the need for commercially-desirable device form factors. The spectrum assigned to each 600 MHz filter would count as a separate "band" for this purpose. Given these technical and cost considerations for mobile providers and ultimately consumers, 600 MHz

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[123] *700 MHz Service Rules Order*, 22 FCC Rcd at 15378-79 ¶ 242.

[124] *See Fifteenth CMRS Report*, 26 FCC Rcd at 9826, ¶ 279.

[125] *NPRM* ¶¶ 160-164.

[126] *See* Comments of Verizon Wireless, WT Dkt. No. 12-69 (filed June 1, 2012); Reply Comments of Verizon Wireless, WT Dkt. No. 12-69 (filed July 16, 2012); Comments of Verizon Wireless, RM-11592 (filed Mar. 31, 2010); Reply Comments Verizon Wireless, RM-11592 (filed Apr. 30, 2010).

licensees and their vendors should have the flexibility to decide which 600 MHz bands to include in the devices they market.

C. The Commission Should Use Only Economic Areas for 600 MHz Licenses.

As noted above, to facilitate rapid deployment of mobile broadband services at 600 MHz and to ensure an efficient forward auction of generic spectrum blocks, Verizon supports the Commission's proposal to license all reclaimed 600 MHz broadcast spectrum in Economic Areas (EAs). Verizon agrees that "EA licensing strikes an appropriate balance between geographic granularity from a spectrum reclamation standpoint and having a manageable number of licenses from an auction design standpoint."[127] The Commission's proposal is also consistent with its obligations under Section 309(j)(4) of the Communications Act to allocate spectrum in a manner that will promote investment in, and rapid deployment of, new technologies and services.[128]

While larger areas such as EAGs and REAGs ordinarily would be preferable from a facilities deployment and auction design perspective, EAs draw an appropriate balance between enabling the efficient deployment of nationwide and regional services, and the policy objectives set forth in Section 309(j) and the Spectrum Act.[129] The Commission should not adopt service areas smaller than EAs, such as CMAs. Larger geographic licenses offer mobile providers

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[127] *NPRM* ¶ 148.

[128] *See* 47 U.S.C. § 309(j)(4) ("In prescribing regulations pursuant to paragraph (3), the Commission shall—…(C) consistent with the public interest, convenience, and necessity, the purposes of this chapter, and the characteristics of the proposed service, prescribe area designations and bandwidth assignments that promote…investment in and rapid deployment of new technologies and services").

[129] *See* 47 U.S.C. § 309(j)(4)(C); Spectrum Act § 6403(c)(3); Comments of Verizon Wireless, WT Dkt. No. 06-150, at 9-15 (filed May 23, 2007).

flexibility in deployment and the ability to take advantage of economies of scale.[130] For example, in selecting license areas for the Upper 700 MHz band plan, the Commission noted that "large geographic areas would readily allow aggregation into a nationwide service area and would enable multiple parties to bid on this spectrum for the provision of high-speed wireless data services."[131]

License areas of EAs also facilitate a more efficient auction. When attempting to build a national or regional footprint, in the auction or on the secondary market, licenses larger than a CMA will require fewer transactions and make it less likely that an operator would come out of an auction with "holes" in its footprint. And uniform service areas also are necessary for the Commission's proposal to conduct forward auction bidding on generic spectrum blocks.

While Verizon ordinarily would prefer a larger area such as an EAG or REAG, as the Commission notes, there is a countervailing issue in the upcoming incentive auction that has not previously been present: the Commission does not know ahead of the auction how much broadcast spectrum will be reclaimed or whether the same amount of spectrum will be available in every geographic area. Using REAGs, the largest geographic sized licenses, could limit the Commission's flexibility to provide the most amount of spectrum in as many geographic areas as the repacking methodology will allow. That uncertainty militates in favor of smaller EAs, which strike an "appropriate balance."[132] EAs facilitate aggregating spectrum in regions or nationwide, either during the auction or on the secondary market, which will be useful for services that

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[130] *See Upper 700 MHz Service Rules Order*, 15 FCC Rcd at 501 n. 145 ("These [larger] geographic areas should permit industry to internalize the costs of developing its own standards.").

[131] *Id.* at 501 ¶ 60.

[132] *NPRM* ¶ 148.

require nationwide footprints. EAs are large enough to allow winning licensees to deploy regional services, but small enough to allow bidders to acquire a very limited amount of area – often only a few counties. And uniform use of EAs for all spectrum blocks will facilitate an efficient incentive auction and more clearing of broadcast spectrum for mobile broadband. And as discussed above, package bidding could also enable bidders interested in acquiring broader coverage to achieve that goal while still maintaining the flexibility offered by EA licenses.

Section 6403(c)(3) of the Spectrum Act obligates the Commission to "consider assigning licenses that cover geographic areas of a variety of different sizes."[133] That provision, however, does not obligate the Commission to offer different-sized licenses in the forward auction. The Commission's explicit statutory obligations in selecting a license size are to promote rapid deployment of advanced wireless broadband services and to ensure an efficient incentive auction. EAs most effectively fulfill those goals. The Commission has already recognized that auctioning licenses that are too small will undermine these goals, noting that "[w]hen [license] areas are inefficiently small, the costs of aggregation during or after the auction in terms of delay and transaction costs may harm both service providers and customers alike."[134]

Finally, the administrative challenges associated with managing a forward auction and subsequent assignment process for 734 individual CMA-based generic licenses, and interjecting even more geographical complexity into the repacking formula, would be very high and could extend the duration and complexity of the auction – contrary to the interests of reverse auction bidders as well. Where market forces create economic incentives to deploy service in smaller

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[133] Spectrum Act § 6403(c)(3).

[134] *Upper 700 MHz Service Rules Order*, 15 FCC Rcd at 501.

geographic areas, existing providers and new entrants can employ the Commission's partitioning rules to accommodate those incentives.

D. The Commission Should Provide Clear Pre-Auction Guidance on Coordinating with 600 MHz Operations in Canada and Mexico

The Commission correctly notes that it may be necessary to modify existing 700 MHz band international arrangements or create new international arrangements for the 600 MHz band licensees to implement 600 MHz mobile operations in areas along the U.S. borders with Canada and Mexico.[135] Verizon has had substantial experience coordinating its Upper 700 MHz C Block license in border areas. Those arrangements for 700 MHz were difficult in part because there were no clear rules or guidance to govern disputes that arose in the coordination process. For this reason, it is very important for the Commission to begin discussions with Canada and Mexico now.

Clear guidance on coordinating with 600 MHz operations in Canada and Mexico is important not just to ensure successful deployment of 600 MHz broadband services in border areas but also to facilitate an efficient forward auction. The forward auction will be more efficient if bidders know beforehand whether licensed facilities in border areas will generally be free from harmful cross-border interference through coordination agreements with Canada and Mexico, and/or if they would need to configure their facilities to protect foreign operations. If post-auction coordination arrangements are needed for operations along the Canadian and Mexican borders, the Commission should publish such information well before the auction, even if the precise frequencies available in the forward auction are not known. Only through early

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[135] *NPRM* ¶ 197.

guidance on coordinating with 600 MHz operations in Canada and Mexico can bidders in the forward auction assign the appropriate value to licenses in those geographic areas.

E. The Commission Should Apply Partitioning, Disaggregation, and Spectrum Leasing Rules to 600 MHz Licenses.

The Commission should apply its Part 27 geographic partitioning, disaggregation, and spectrum leasing rules to 600 MHz band licenses, as proposed in the *NPRM*.[136] Allowing licensees the ability to partition and/or disaggregate portions of their spectrum holdings, and/or to lease such holdings, promotes a robust secondary market in spectrum. And it particularly facilitates acquisition of spectrum rights by smaller carriers, who may serve small, targeted markets.[137] These rules have been effective and should be applied to the 600 MHz band.

For example, Verizon has successfully used partitioning to lease its Upper 700 MHz C Block spectrum to nearly two dozen participants in its "LTE in Rural America" (LRA) program. Through this program, rural wireless carriers provide 4G LTE services within their coverage area on the C Block spectrum, bringing advanced mobile broadband services to rural communities.[138] The Commission should ensure such beneficial secondary market activity can continue in the 600 MHz band by applying its partitioning, disaggregation and leasing rules to that band.

F. 600 MHz Licensees Should Have 10-Year License Terms for Unencumbered Spectrum and Be Subject to Population-Based Performance Requirements.

Verizon supports the Commission's proposal to grant licenses for 10-year terms, which is consistent with the terms it has used for 700 MHz and other wireless licenses.[139] Verizon also supports performance requirements on 600 MHz licenses to drive licensees to put the spectrum

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[136] *NPRM* ¶¶ 387, 391.

[137] *See Fifteenth CMRS Report*, 26 FCC Rcd at 9828, ¶ 282.

[138] *See* http://news.verizonwireless.com/news/2012/09/4G-LTE-rural-america-conference.html.

[139] *NPRM* ¶ 392.

to use to serve the public.[140] The Commission should adopt population-based performance requirements similar to those the Commission recently ordered for AWS-4 spectrum licensees.[141]

Specifically, the Commission should adopt following build-out requirements:

- *600 MHz Interim Build-out Requirement*. Within four (4) years, a 600 MHz licensee shall provide signal coverage and offer service to at least forty (40) percent of its total 600 MHz population. A licensee's total 600 MHz population shall be calculated by summing the population of all of its license authorizations in the 600 MHz band.
- *600 MHz Final Build-out Requirement*. Within seven (7) years, a 600 MHz licensee shall provide signal coverage and offer service to at least seventy (70) percent of the population in each of its license authorization areas.

These requirements will accomplish the Commission's primary goal for performance requirements: "to foster timely deployment" in the 600 MHz band for the provision of wireless, terrestrial broadband service "and to enable the Commission to take appropriate corrective action should the required deployment fail to occur."[142]

With respect to penalties for failure to meet these requirements, the Commission should adopt the approach used for the WCS REAG and EA licenses:[143]

- In the event a 600 MHz licensee fails to meet the 600 MHz Interim Build-out Requirement, the term of *all* of the licensee's 600 MHz license authorizations shall be reduced by two years.
- In the event a 600 MHz licensee fails to meet the 600 MHz Final Build-out Requirement in any of its license areas, its 600 MHz license for each license authorization area in which it fails to meet the build-out requirement shall terminate automatically without Commission action for those geographic portions of its license where it is not providing service, and such licensee may be subject to an appropriate enforcement action, including forfeitures. The Commission would then re-auction the unserved area as a new license.

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[140] *NPRM* ¶¶ 392, 394.

[141] *See Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, Report and Order and Order of Proposed Modification, FCC 12-151 (rel. Dec. 11, 2012) ("*AWS-4 Service Rules Order"*), ¶¶ 187-88.

[142] *AWS-4 Service Rules Order*, ¶ 193.

[143] *See* 47 C.F.R. § 27.13(*h*)-(*i*).

These penalties meet the Commission's goal of imposing "meaningful and enforceable consequences" for failure to meet the 600 MHz build-out requirements, without discouraging investment by denying the licensee the benefits of the build-out accomplished during the initial license term.[144]

These population-based, "keep-what-you use" performance requirements will ensure 600 MHz licensees deploy wireless broadband services effectively and efficiently throughout the nation. This approach accords with the Commission's long-standing policy of utilizing population-based construction benchmarks. Wireless providers offer services for the benefit of consumers, making alternative build-out requirements, such as coverage of land mass, a poor measure of the public benefit. A population-based build-out requirement will ensure that licensees provide wireless broadband services where consumers actually will use them and need them.

This proposal also promotes rapid deployment and service to the public. Licensees who fail to meet the interim four-year build-out requirement face sanctions shortening their licenses. In addition, licensees who fail to meet the seven-year coverage requirement risk losing unused spectrum. The "new applicant" process provides an opportunity for third parties to bid for the unserved area, but it does not foreclose service by the licensee if no competing bidder materializes. In that case, the incumbent licensee should be allowed to reclaim the unserved area.

Verizon does not support "use-it-or-lease-it" or "use-it-or-share-it" requirements.[145] First, such obligations do not carry the same incentive as "use-it-or-lose-it." Second, they are

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[144] *NPRM* ¶ 398.

[145] *NPRM* ¶¶ 404-405.

difficult to administer. The Commission has substantial experience with reclaiming unused spectrum for re-auction, but little experience judging whether a licensee has entered into "good faith negotiations with third parties expressing an interest" in either leasing or using unused spectrum. Third, unless "use-it-or-lease-it" and "use-it-or-share-it" rules come with incentive for the lessee or sharer actually to build-out the spectrum, the rules do not address the heart of the problem: the spectrum has not been put to use. In contrast, the Commission is familiar with imposing such requirements on a newly-auctioned license for the unserved area. In addition, it is not at all clear that any party would be interested in such arrangements given the potential for license termination caused by the licensee's failure to meet its performance requirements, which presumably would also terminate any lease or sharing arrangement with the licensee.

The Commission should not experiment with untried performance requirements with this spectrum, the value of which is critical to Congress's statutory scheme for the incentive auction. Rather, it should continue to use established performance-based requirements and penalties such as those proposed above. For similar reasons, the Commission should apply the established substantial service license renewal criteria used for the 700 MHz band, including the provisions for a renewal expectancy and the exclusion of comparative renewal proceedings.[146]

Finally, as a corollary to these performance and renewal requirements, the Commission should afford 600 MHz licensees access to this spectrum as expeditiously as possible after the incentive auction closes and individual licenses are assigned to the winning forward auction bidders. Therefore, it is critical that winning reverse auction bidders and stations that will remain on the air after repacking be subject to a date certain by which they must cease broadcasting in the 600 MHz band. The Commission thus should adopt reasonable deadlines for

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[146] *See NPRM* ¶ 409 (citing *700 MHz First Report and Order* ¶¶ 75-77).

remaining broadcasters to cease broadcasting in the 600 MHz band and construct new facilities, and for broadcasters with winning exit bids to transition their businesses as appropriate.[147] In no event should this period extend beyond the three-year statutory deadline for reimbursement of relocation costs (which, in any case, applies only to repacked stations),[148] and Verizon expects that the record will support a deadline of substantially shorter duration.[149] For the same reasons, Verizon supports the Commission's proposals "that a winning reverse auction bidder that relinquishes all of its spectrum usage rights with respect to its pre-incentive auction television channel will retain no further rights with regard to that channel" and that all reverse auction bids be deemed "irrevocable, binding offers" that must "be relinquished by a Commission-imposed deadline."[150]

To the extent there are delays in implementing the administrative measures that may be necessary to effect broadcasters' new channel assignments, the Commission should be prepared to toll the performance requirements by a corresponding period. Such assurances will provide mobile broadband providers with added certainty that they will have prompt access to unencumbered frequencies, thereby enhancing the value of the spectrum to forward auction participants.

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[147] *See NPRM* ¶¶ 321-29.

[148] *See* Spectrum Act § 6403(b)(4)(D).

[149] *See NPRM* ¶ 322 (noting that "of the more than 100 licensees whose requests to substitute channels were granted towards the end of the digital transition, most completed construction within 12 months of receiving a construction permit); *id.* ¶ 325 (noting that winning license termination bidders will not need to modify technical facilities).

[150] *See NPRM* ¶¶ 90, 282.

G. The Commission Should Protect Mobile Licensees from Harmful Interference by Clearing Wireless Microphones and LPAS Devices Well in Advance of the Auction.

The Commission has appropriately recognized that, as with the 700 MHz band, it will be necessary to protect the repurposed 600 MHz spectrum from harmful interference by clearing wireless microphones and Low Power Auxiliary Service (LPAS) devices from the auctioned band.[151] In the 700 MHz band, the Commission concluded that wireless microphones and LPAS devices operated on a co-channel basis could interfere with commercial base stations and mobile receivers even if operated at power levels lower than those authorized by the Commission.[152] The same concerns apply here given the similarities between the 600 MHz and 700 MHz bands. Therefore, to establish the certainty and predictability needed to promote robust participation in the forward auction, the Commission should promptly set in motion a process for clearing such devices from the band, including an immediate prohibition on the manufacture, importation, and

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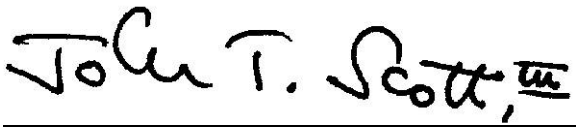
[151] *See NPRM* ¶¶ 225-26, 238.

[152] *See Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band; Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television Transition; Amendment of Parts 15, 74 and 90 of the Commission's Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones,* Report and Order and Further Notice of Proposed Rulemaking, 25 FCC Rcd 643, 663 ¶ 37 (2010).

marketing of devices capable of operating in the repurposed 600 MHz band, and a reasonable but short transition period for existing users to cease operations in the band.

Respectfully submitted,



John T. Scott, III
Robert G. Morse
Christopher D. Oatway
1300 I Street, N.W.
Suite 400 West
Washington, DC 20005
(202) 515-2400

Attorneys for Verizon and Verizon Wireless

Michael E. Glover
Of Counsel

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